

NORTH AMERICAN CRINOIDEA

WACHSMUTH AND SPRINGER

ATLAS.









Memoirs of the Museum of Comparative Zoölogy  
AT HARVARD COLLEGE.  
EIGHTY-THREE PLATES TO ACCOMPANY.  
VOLS. XX. AND XXI.

---

THE NORTH AMERICAN  
CRINOIDEA CAMERATA.

BY CHARLES WACHSMUTH AND FRANK SPRINGER.

EIGHTY-THREE PLATES.

CAMBRIDGE, U. S. A. :  
Printed for the Museum.  
MAY, 1897.





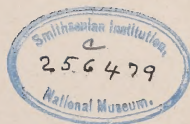


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FRANK SPRINGER.

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TOGETHER WITH THE ACCOMPANYING EXPLANATION.



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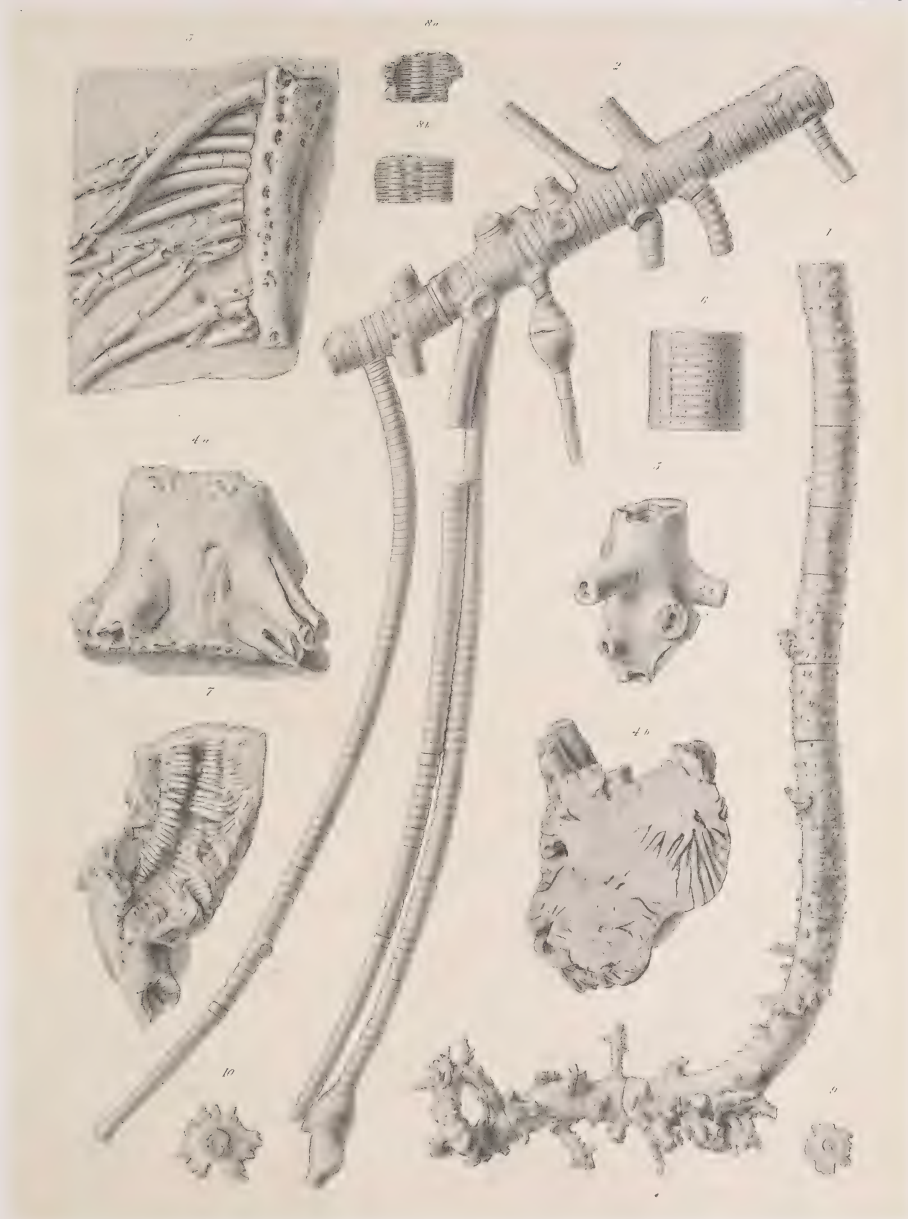
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(All specimens are in the collection of Wachsmuth and Springer.)











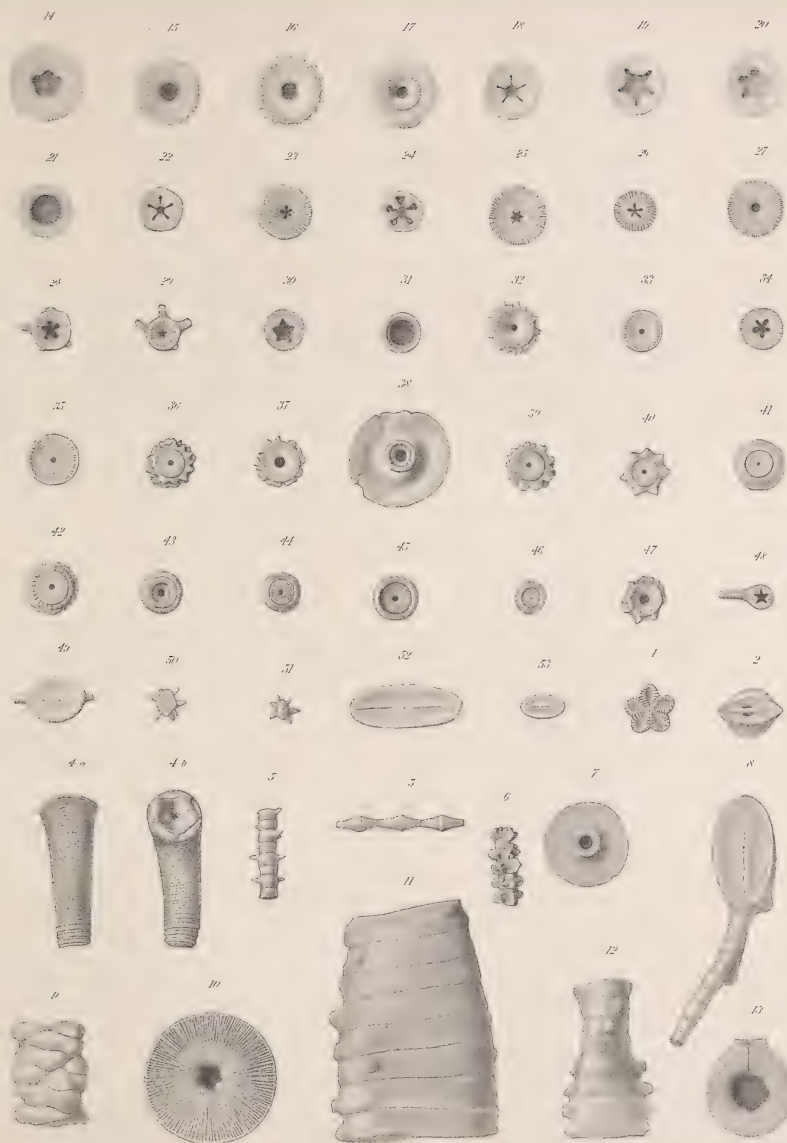
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4a and b represent the proximal end of the stem of an *Onychocrinus*, — 4b showing the infrabasals coalesced with the top stem joint (pp. 62, 65).

17 and 38 represent wide nodal joints to which extremely narrow internodal ones are attached. Figs. 39 to 41 are nodal joints, with or without internodals; figs. 42 to 48 nodals, followed by internodals resting wholly or partly between the projecting margins of the nodals. Traces of new joints occur in figs. 33 and 35. The joints in figs. 14 and 20 probably belong to *Megistocrinus Evansi*; fig. 21 to *Periechocrinus Whitei*; figs. 32, 36, and 39 to *Cactocrinus*; fig. 40 to *Teleocrinus*; to the five oval pieces shown by figs. 49 to 53 to *Platyocrinus*.













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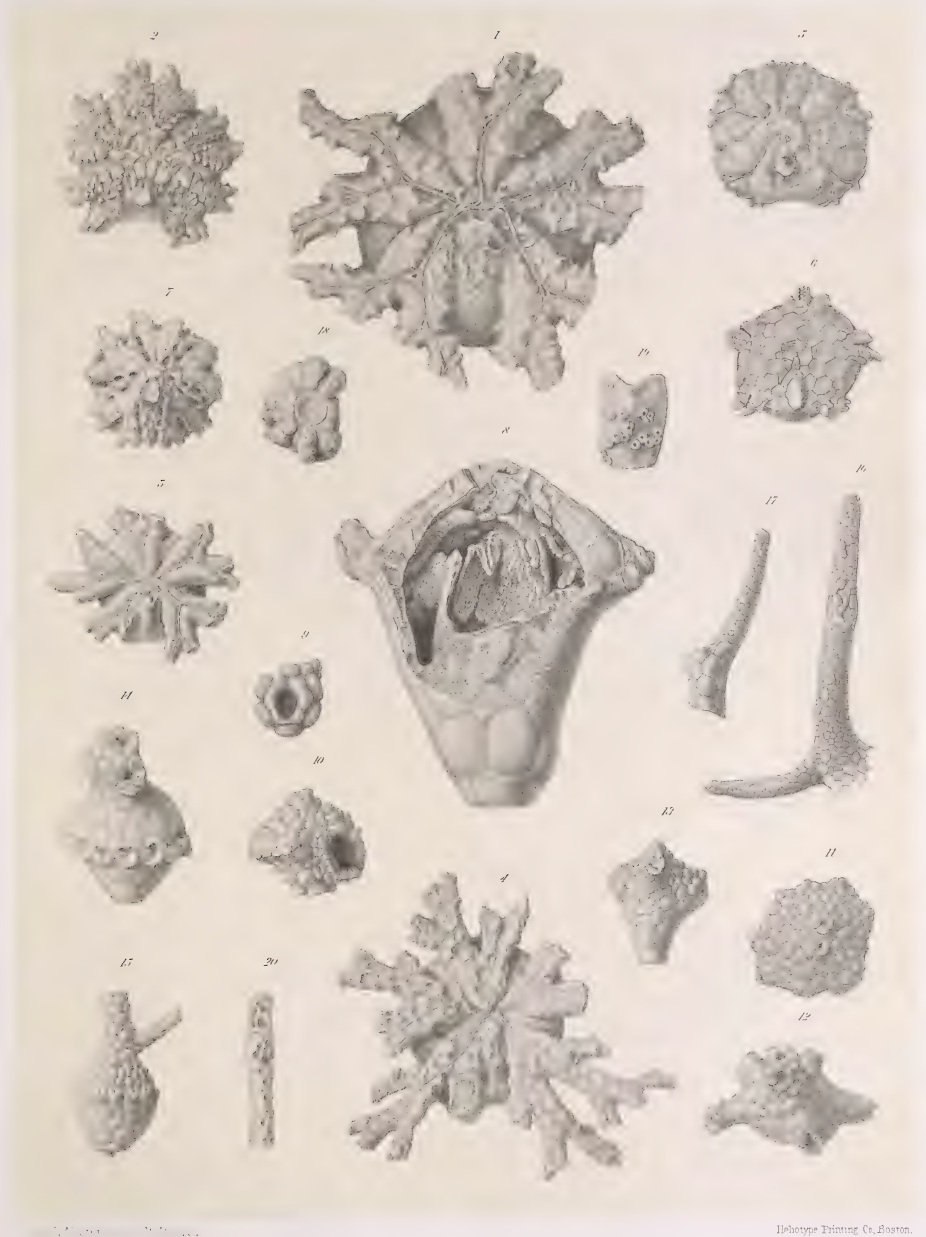


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(All specimens are in the collection of Wachsmuth and Springer, except that of Fig. 6, which is in the collection of Mr. R. R. Rowley.)









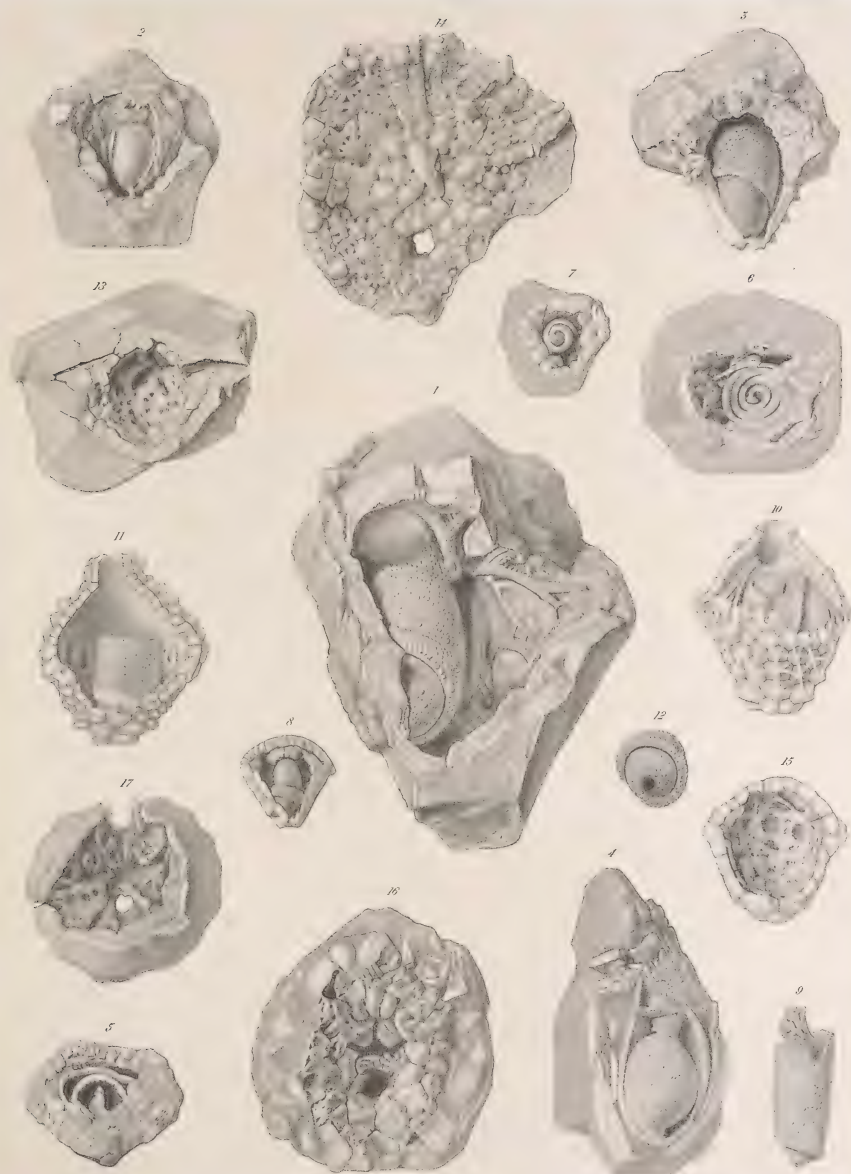


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(All specimens are in the collection of Wachsmuth and Springer, except those of Figs. 10, 11, and 15, which are in the Museum of Comparative Zoölogy.)











# PLATE VI.

(Figs. 1 to 12 are represented to show the orientation of the stem and axial canal among Neozoic Crinoids; figs. 13 to 20 the close affinities between the Ichthyocrinidæ and Comatulæ.)

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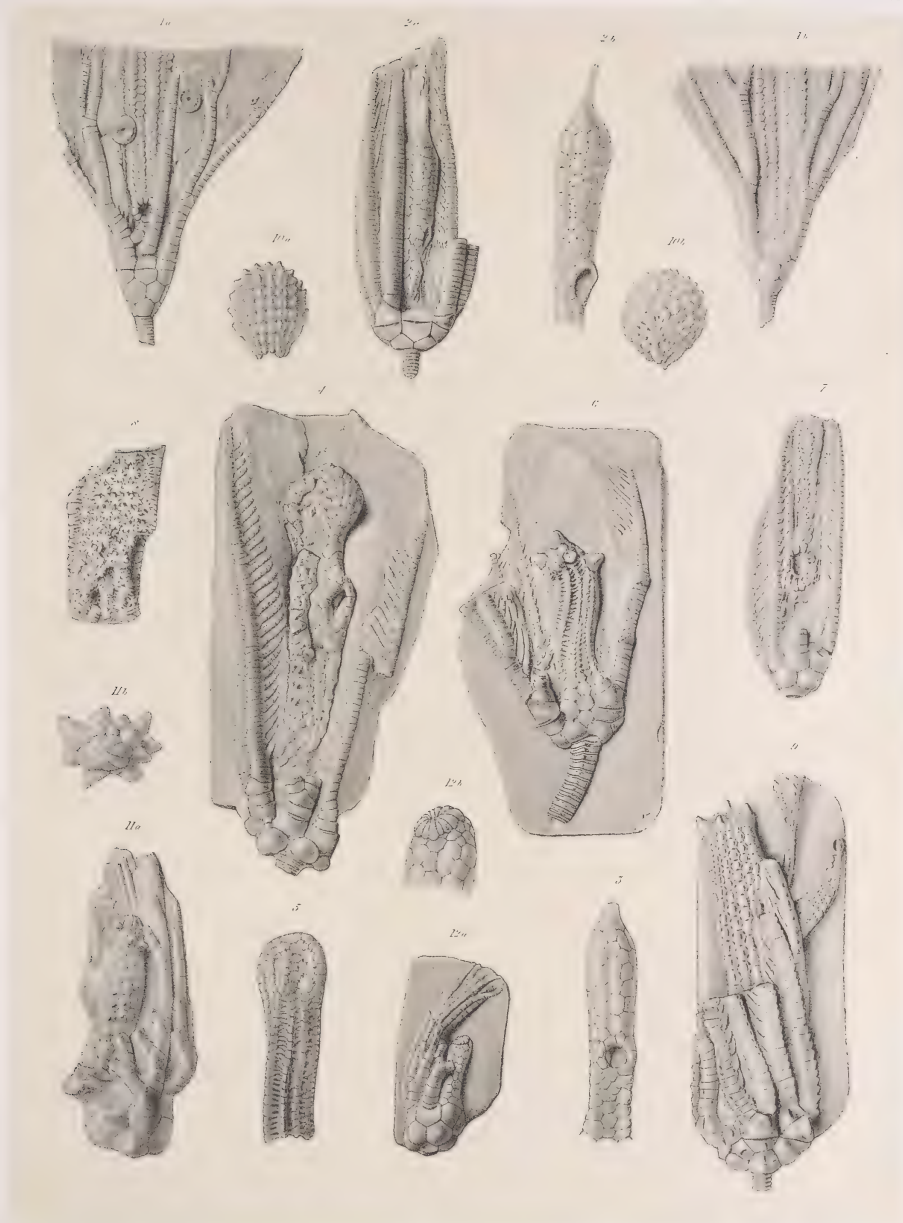


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# PLATE VII.

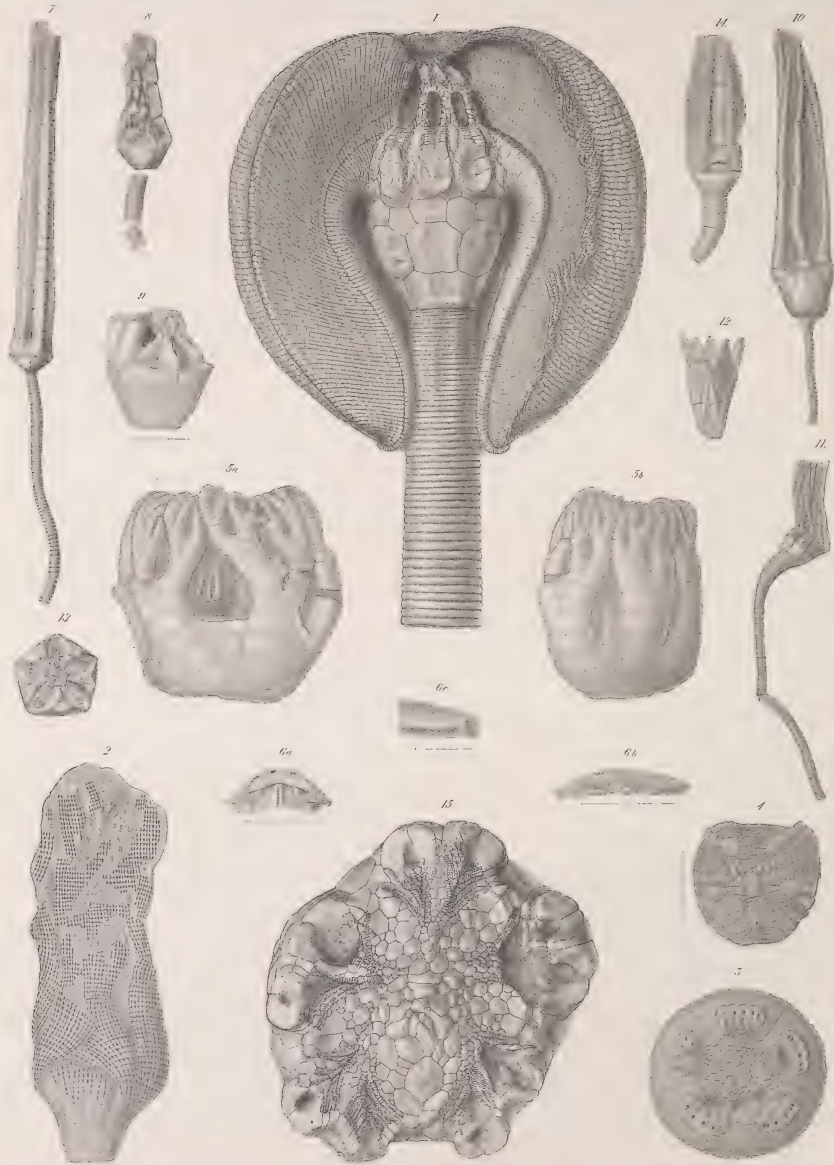
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(All specimens are in the collection of Wachsmuth and Springer.)	











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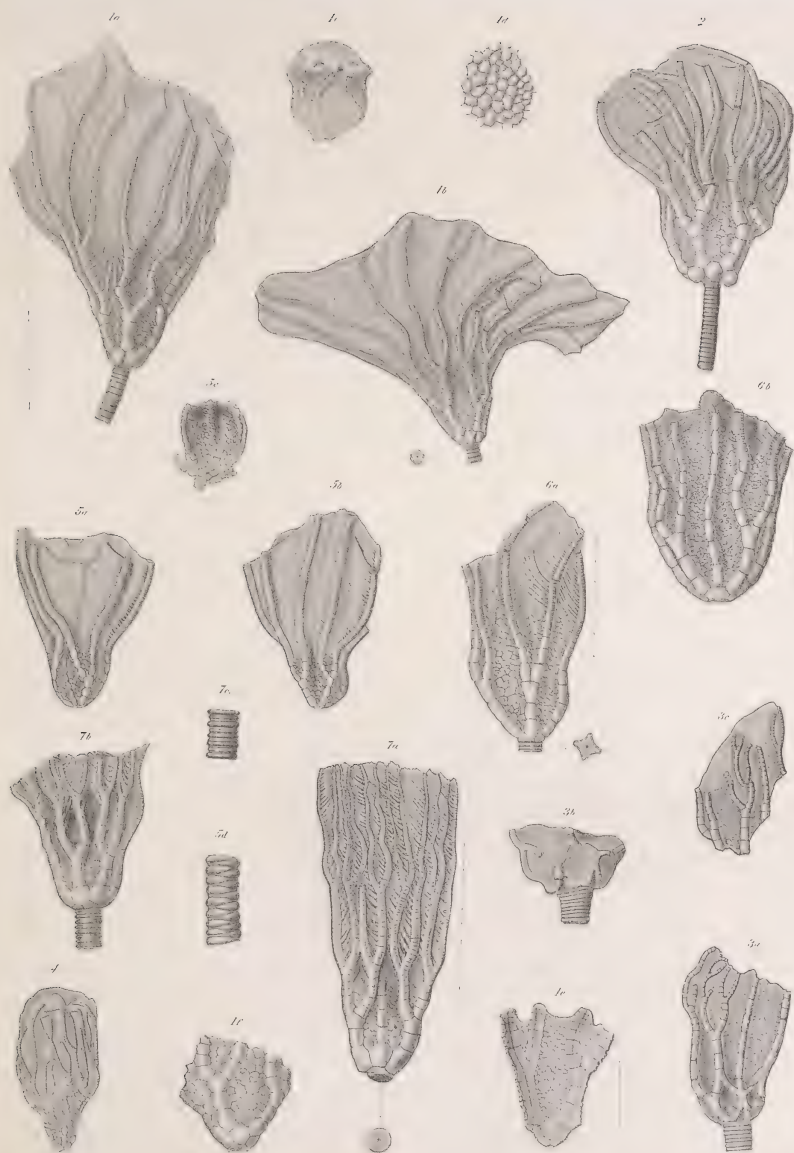
the Indiana Geological Survey for 1891, p. 637, took the liberty of stating, most unwarrantably, that we had described, in the third part of the Revision of the Palæocrinoidea, p. 173 (1885) the arms of *Pisocrinus*, which we "knew nothing whatever about." The tone of his article was such as to preclude any notice from us, except to publish this figure in refutation of his statement. Angelin figured the arms of *Pisocrinus* as early as 1877.)

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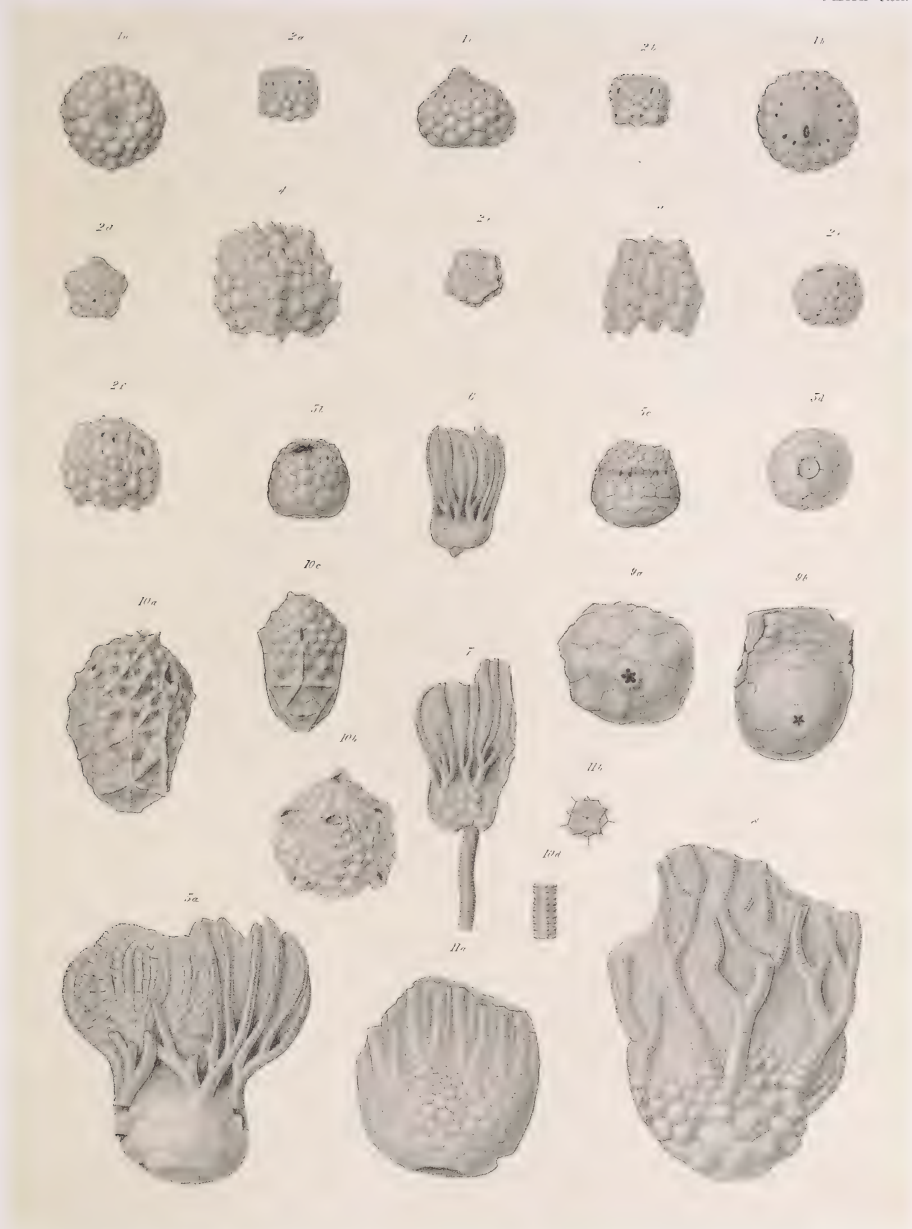






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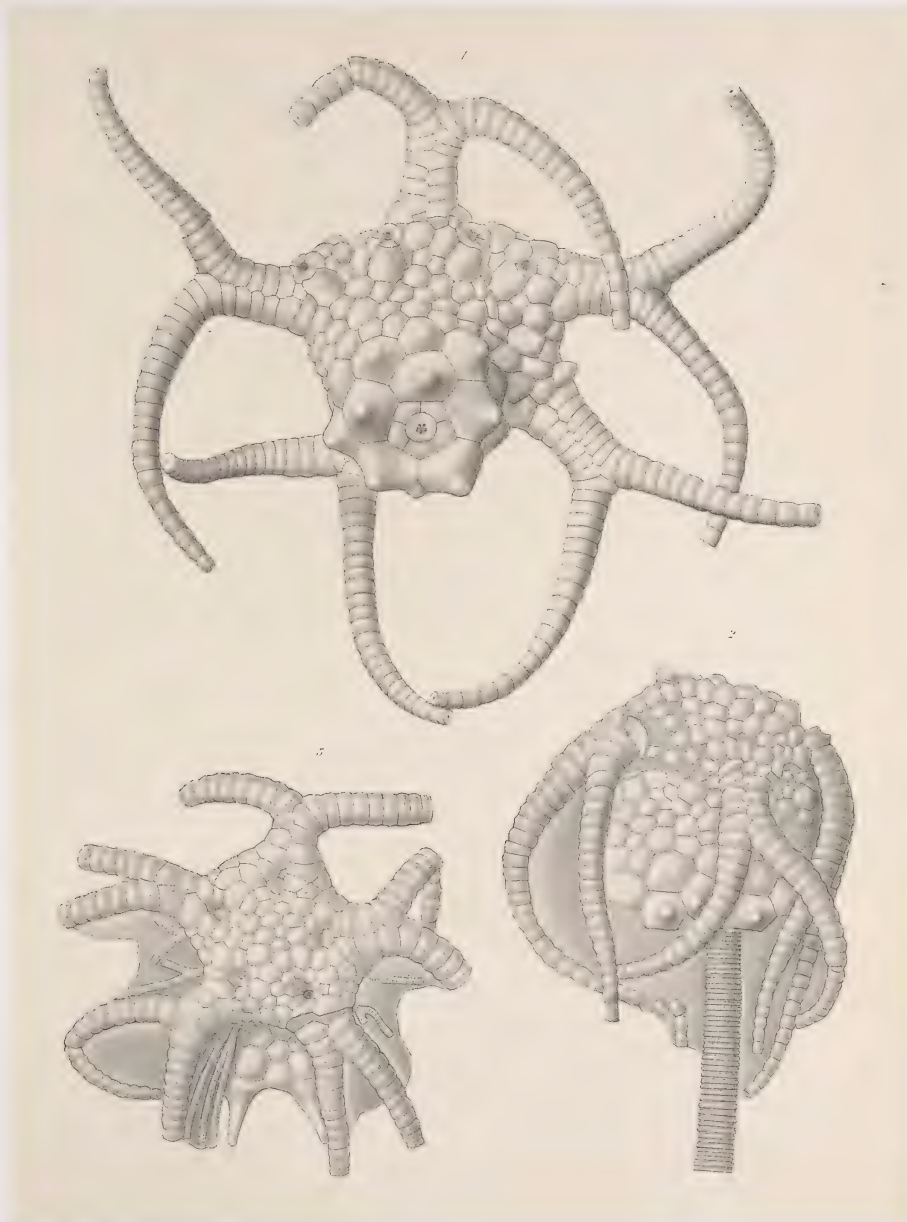


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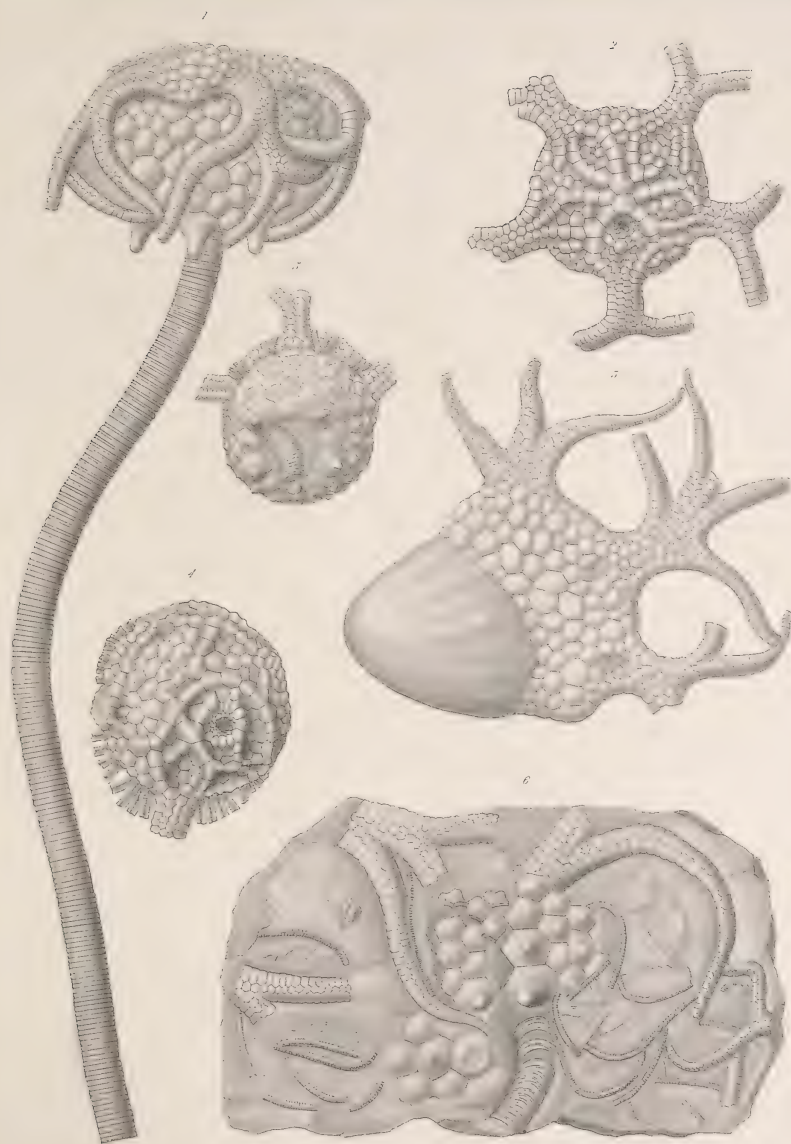


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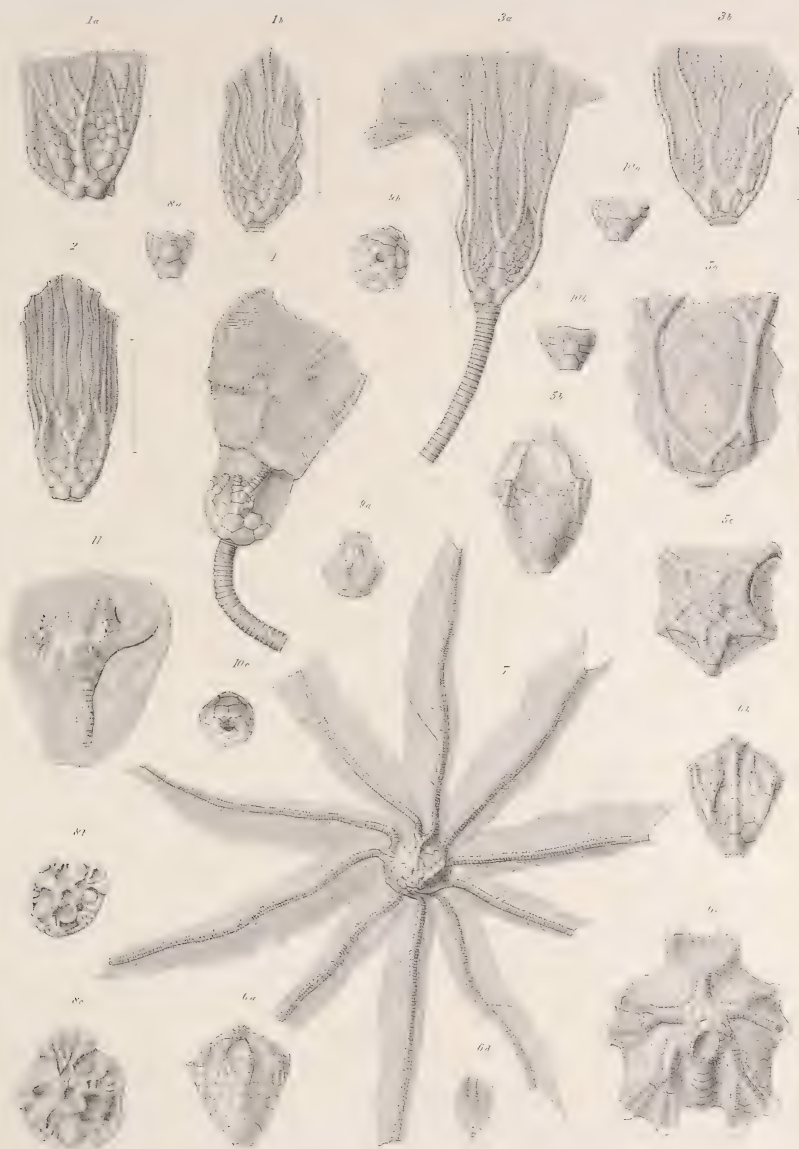






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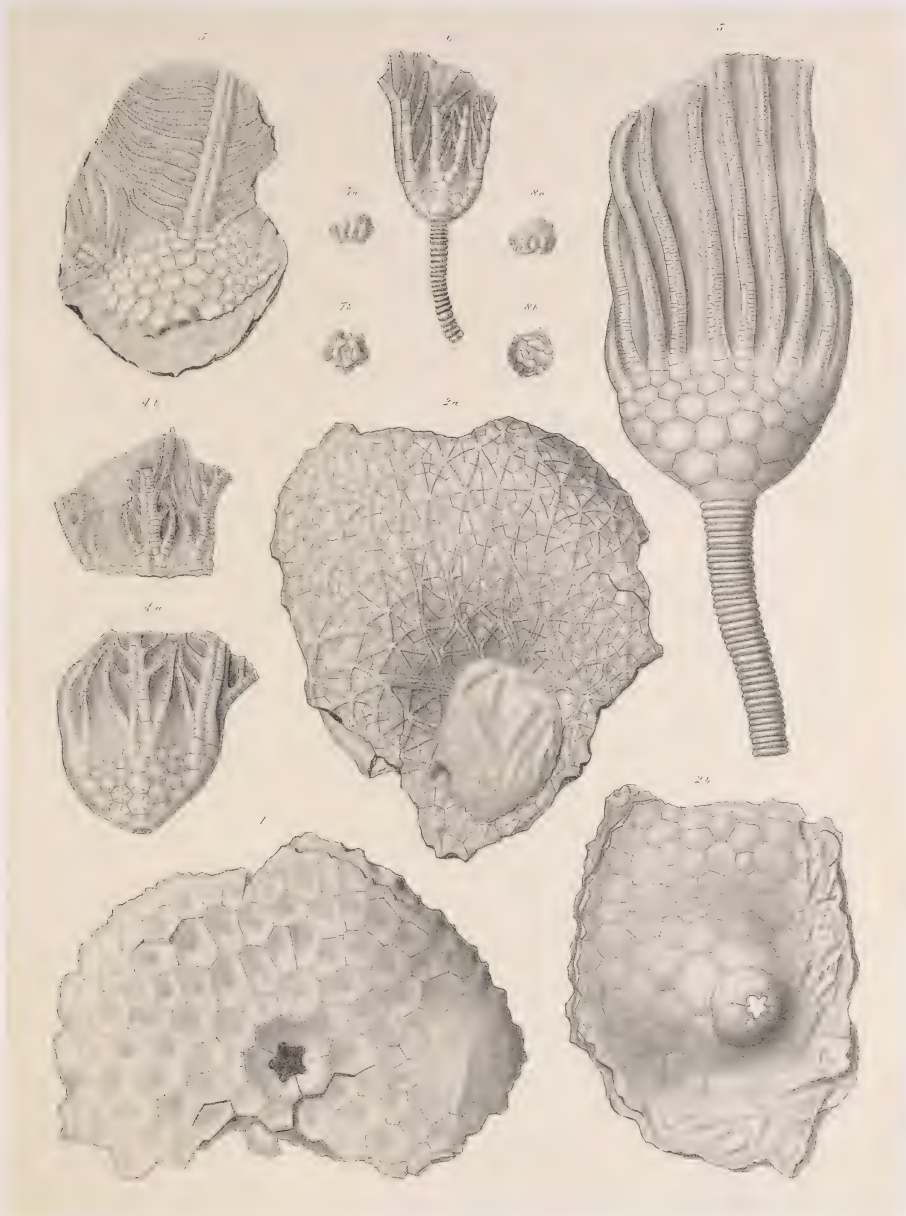






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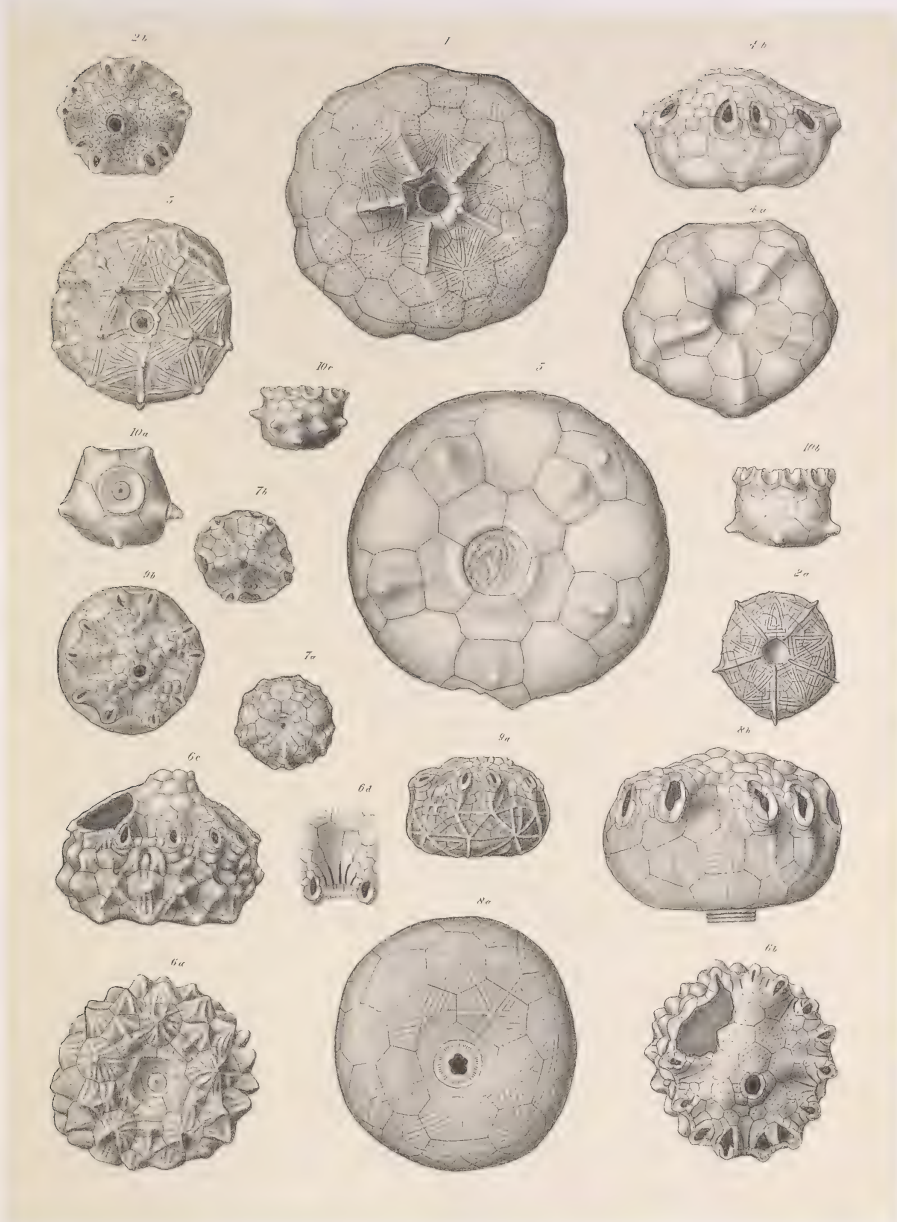






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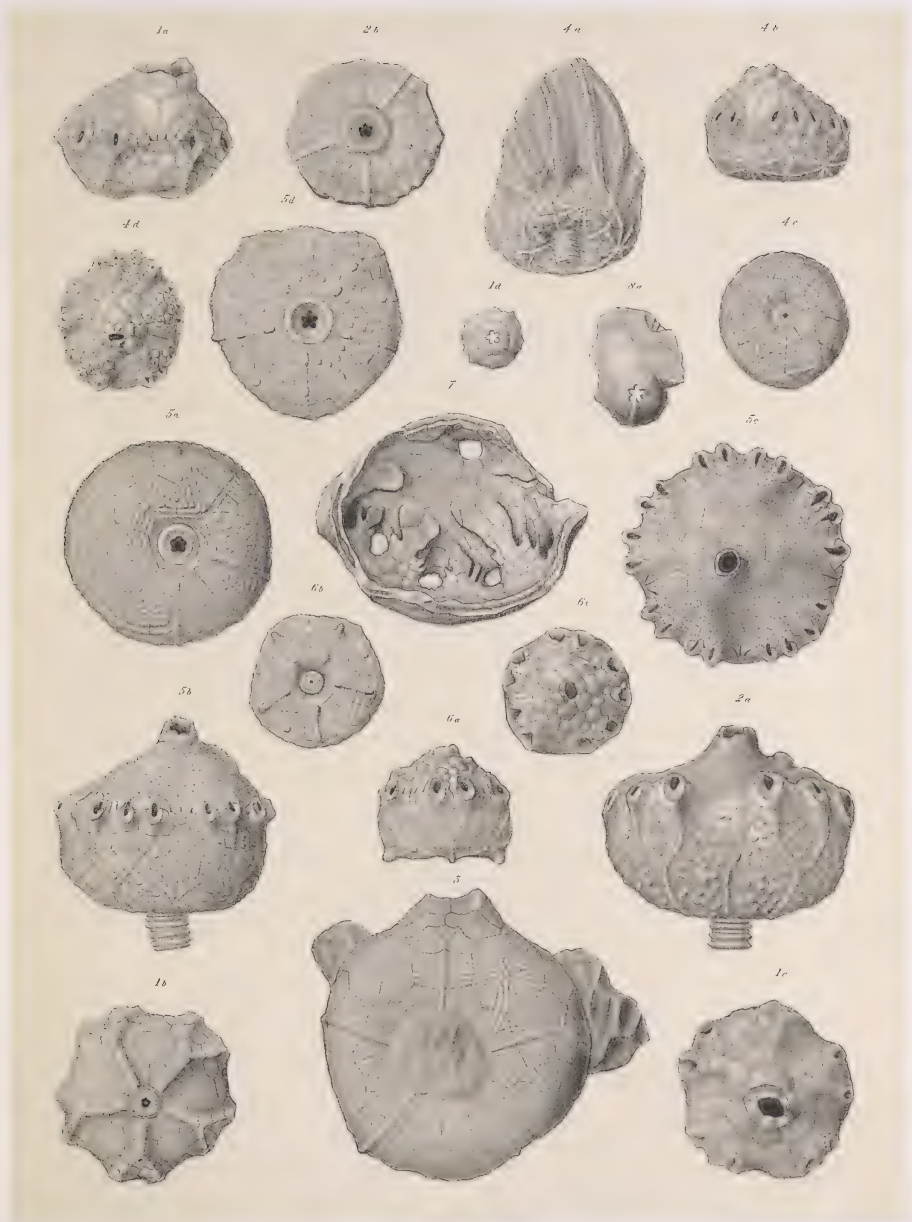






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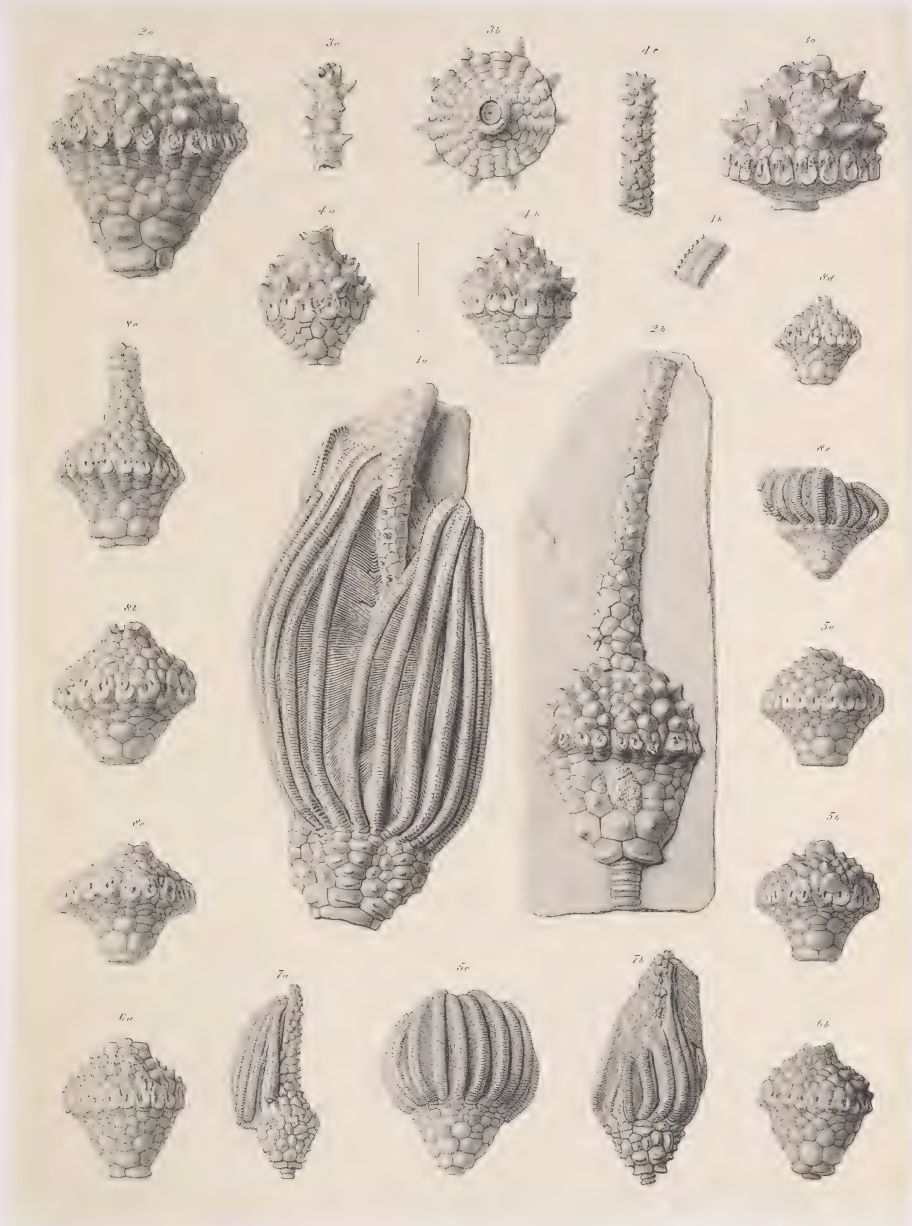






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(All the specimens are in the collection of Wachsmuth and Springer, except that of Fig. 1 <i>a</i> , which is in the Lyon collection.)	



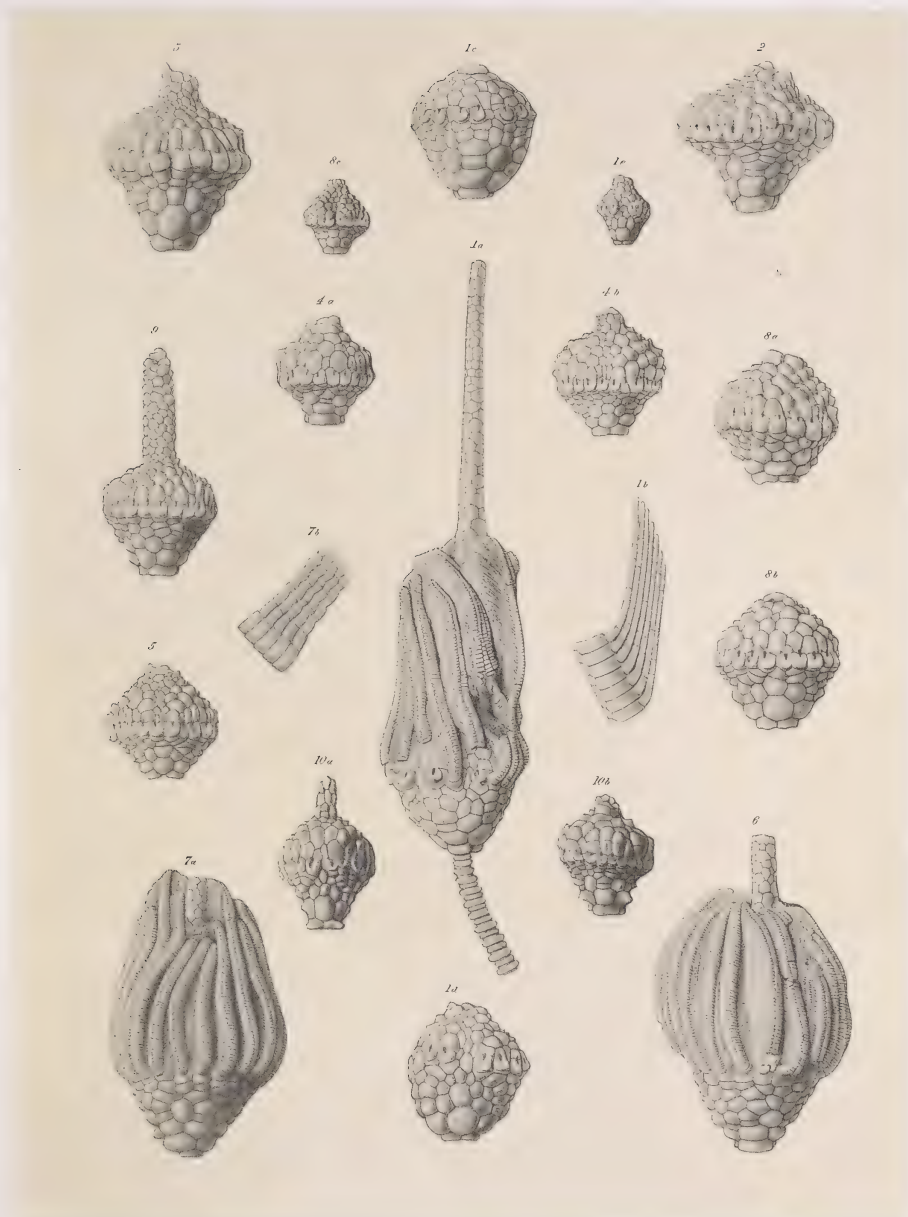






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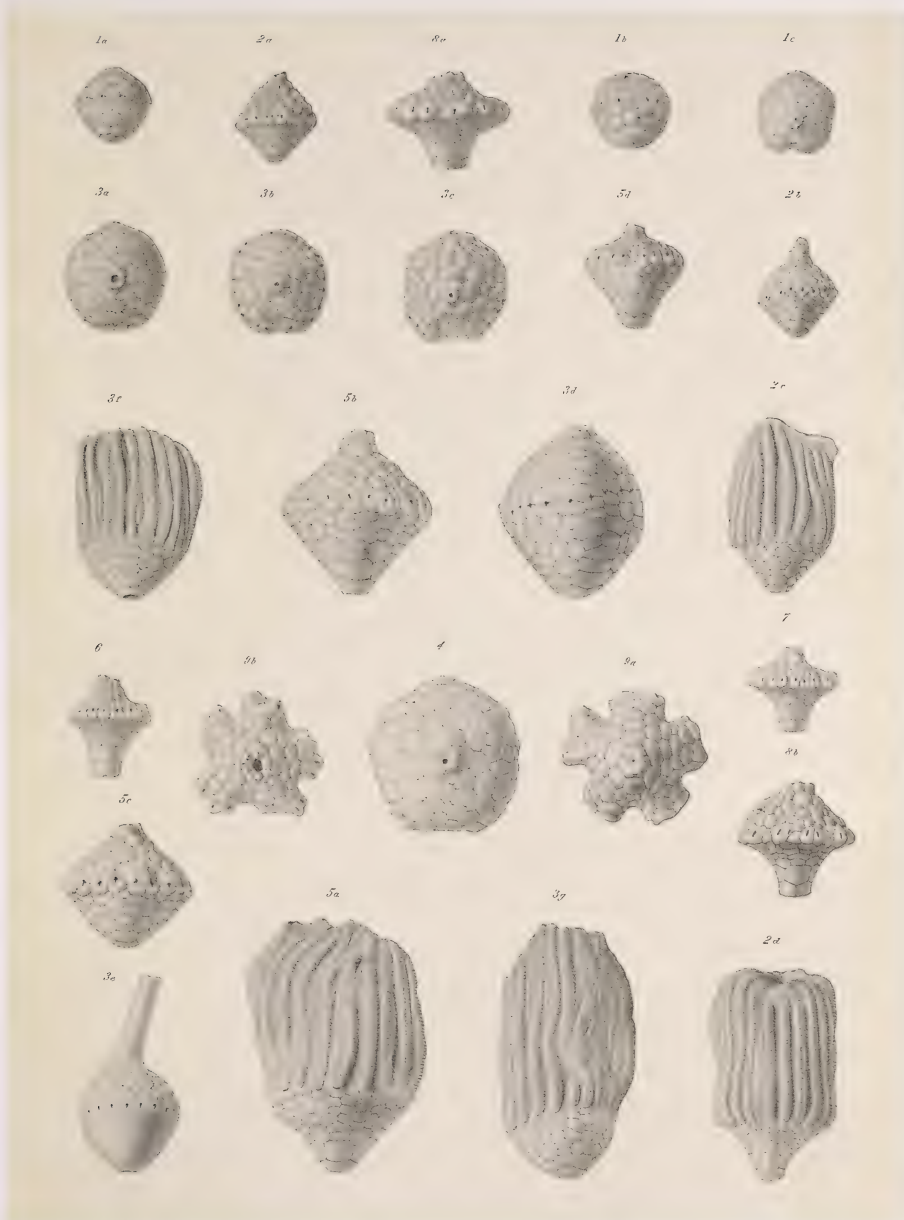




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(All specimens in the collection of Wachsmuth and Springer.)

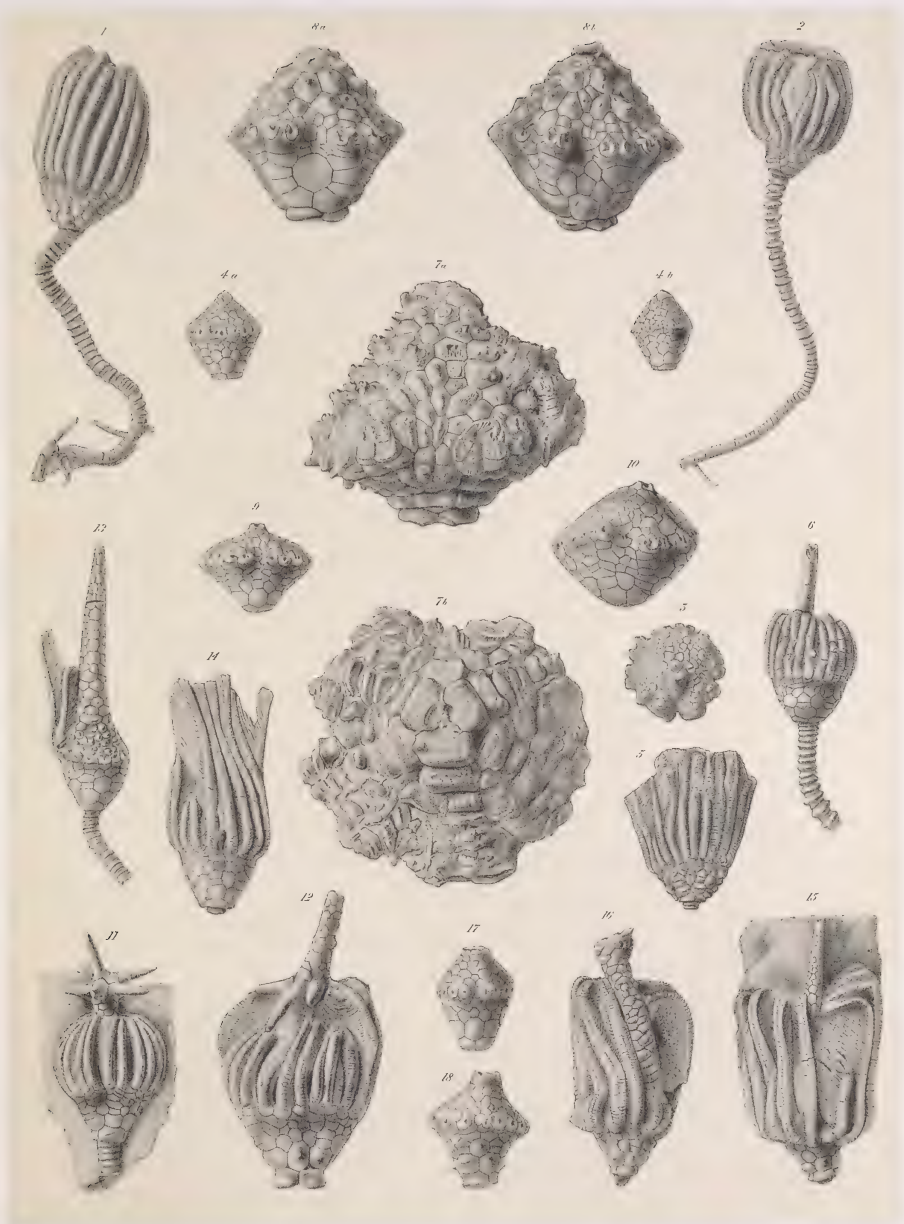






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(All the specimens in the collection of Wachsmuth and Springer, except that of Fig. 7, which is in the Lyon collection.)	









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(All the specimens in the collection of Wachsmuth and Springer.)



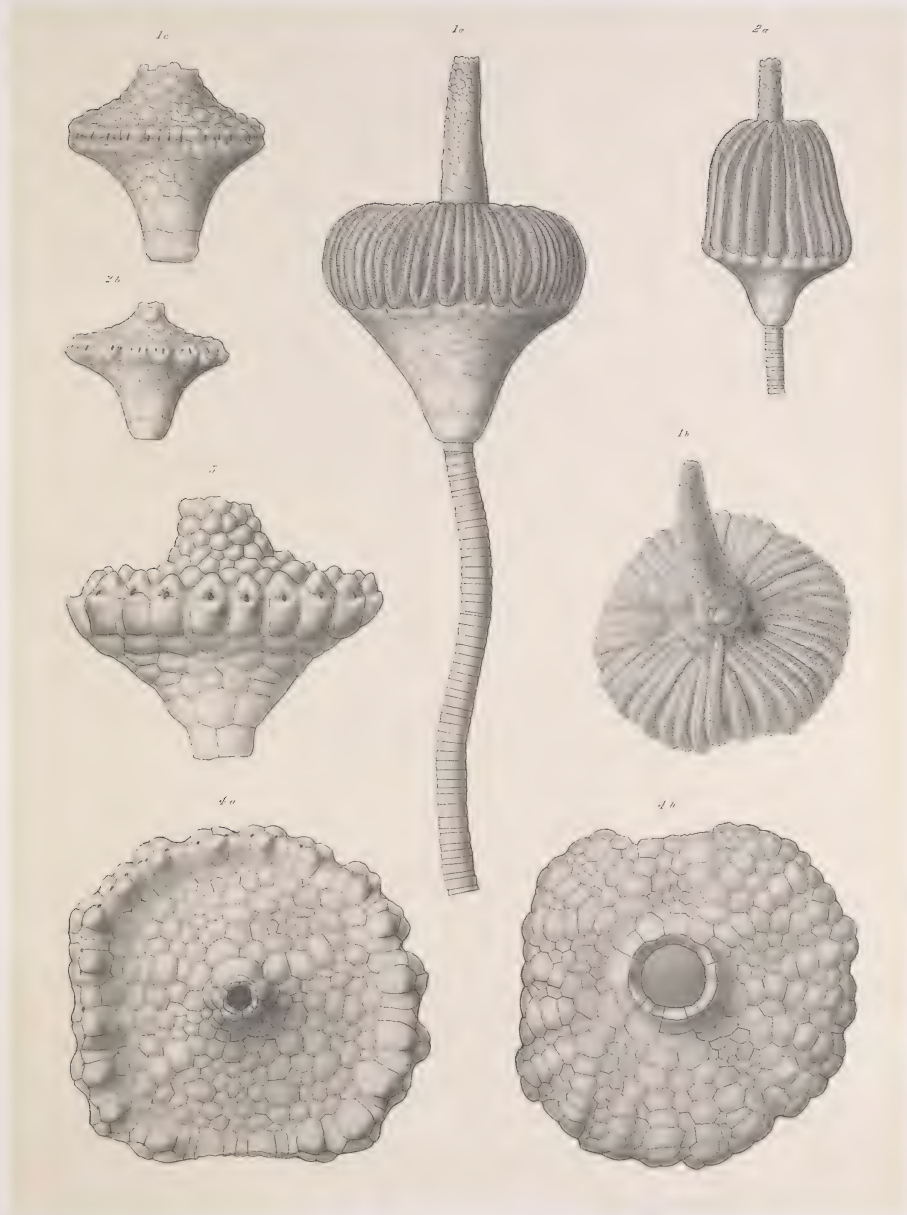






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(All specimens in the collection of Wachsmuth and Springer.)	







# PLATE XXXIII.

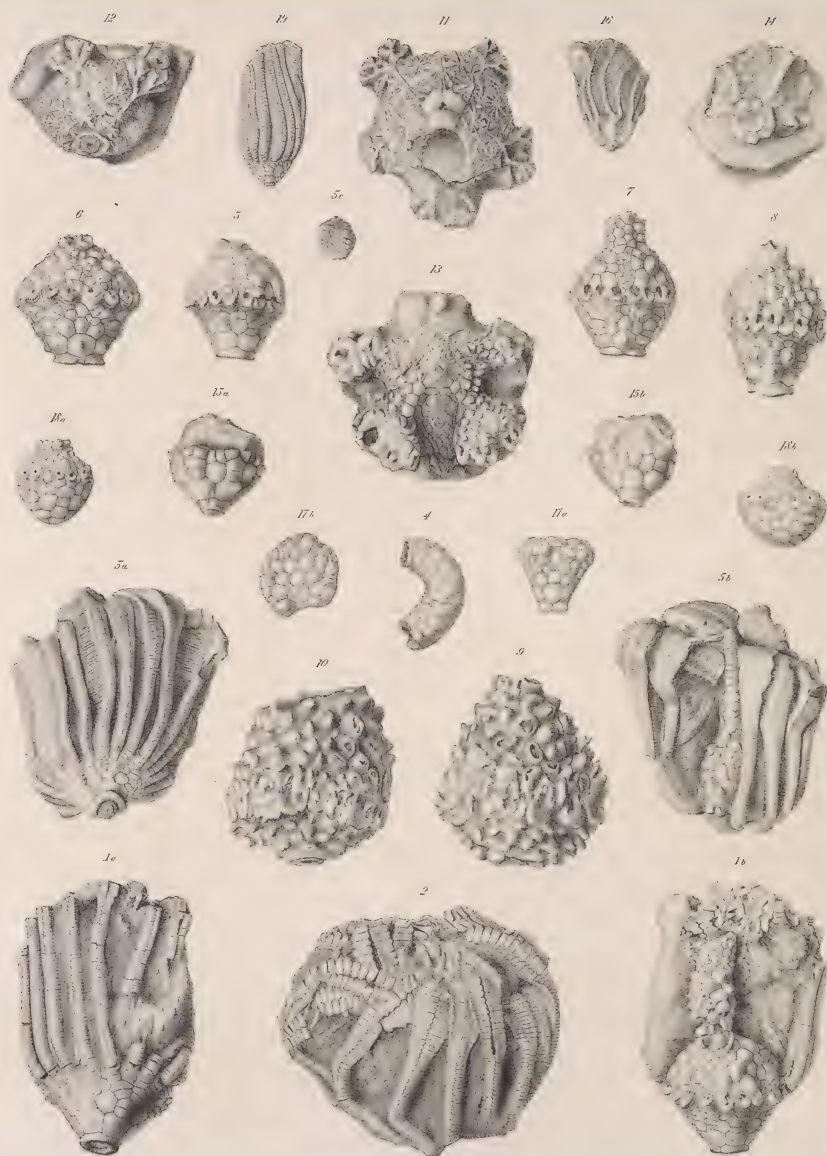
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(All specimens in the collection of Wachsmuth and Springer, unless otherwise stated.)	











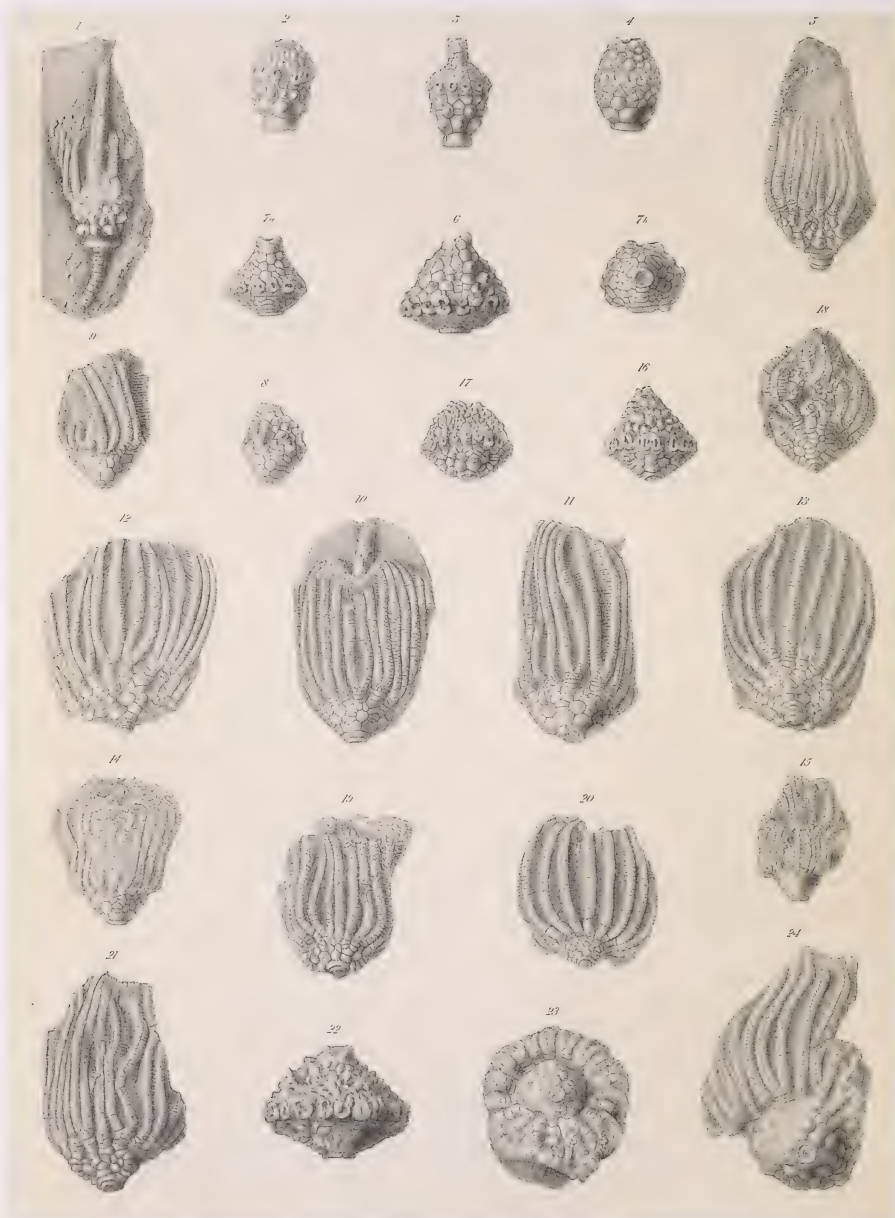
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(All the specimens are in the collection of Wachsmuth and Springer, except those represented by Figs. 18 <i>a</i> and 18 <i>b</i> , which are in the possession of Mr. R. R. Rowley, and Fig. 19, which is owned by Mr. F. A. Sampson.)	







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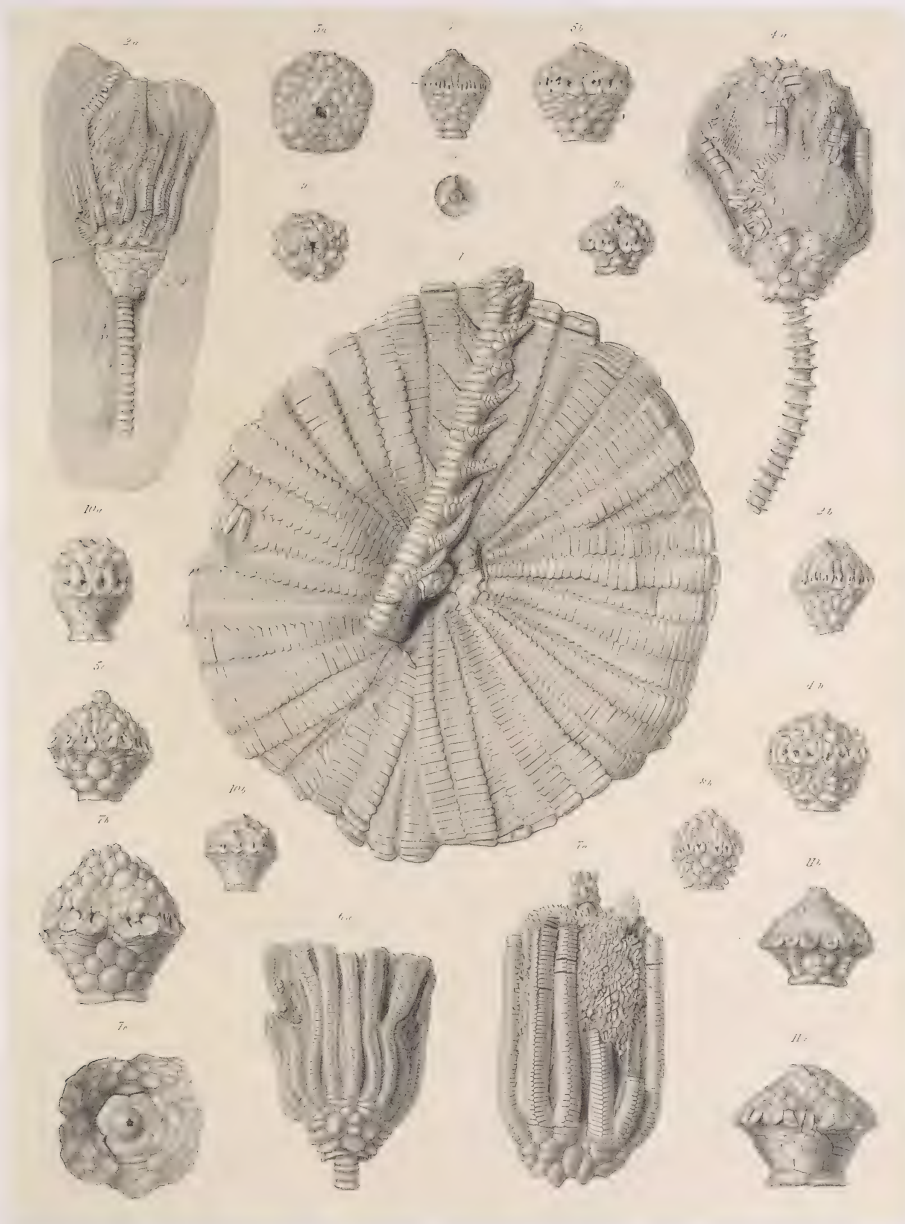
- Fig. 21. Specimen with arms, showing anterior side; the arms alternately paired.  
22. Side view of the calyx.  
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24. Specimen with some of the arms paired.

(All specimens in the collection of Wachsmuth and Springer, unless otherwise stated.)



# PLATE XXXVI.

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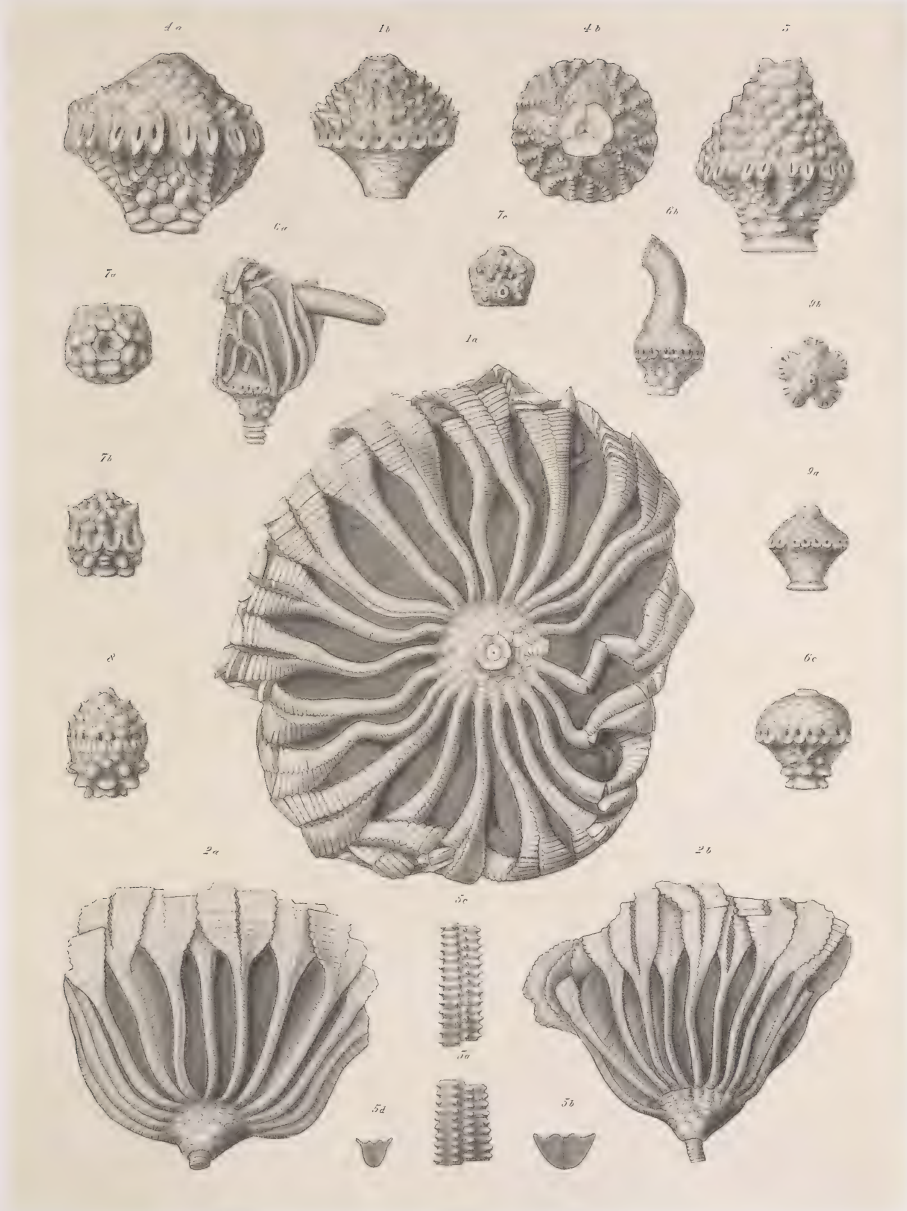




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(All specimens in the collection of Wachsmuth and Springer.)





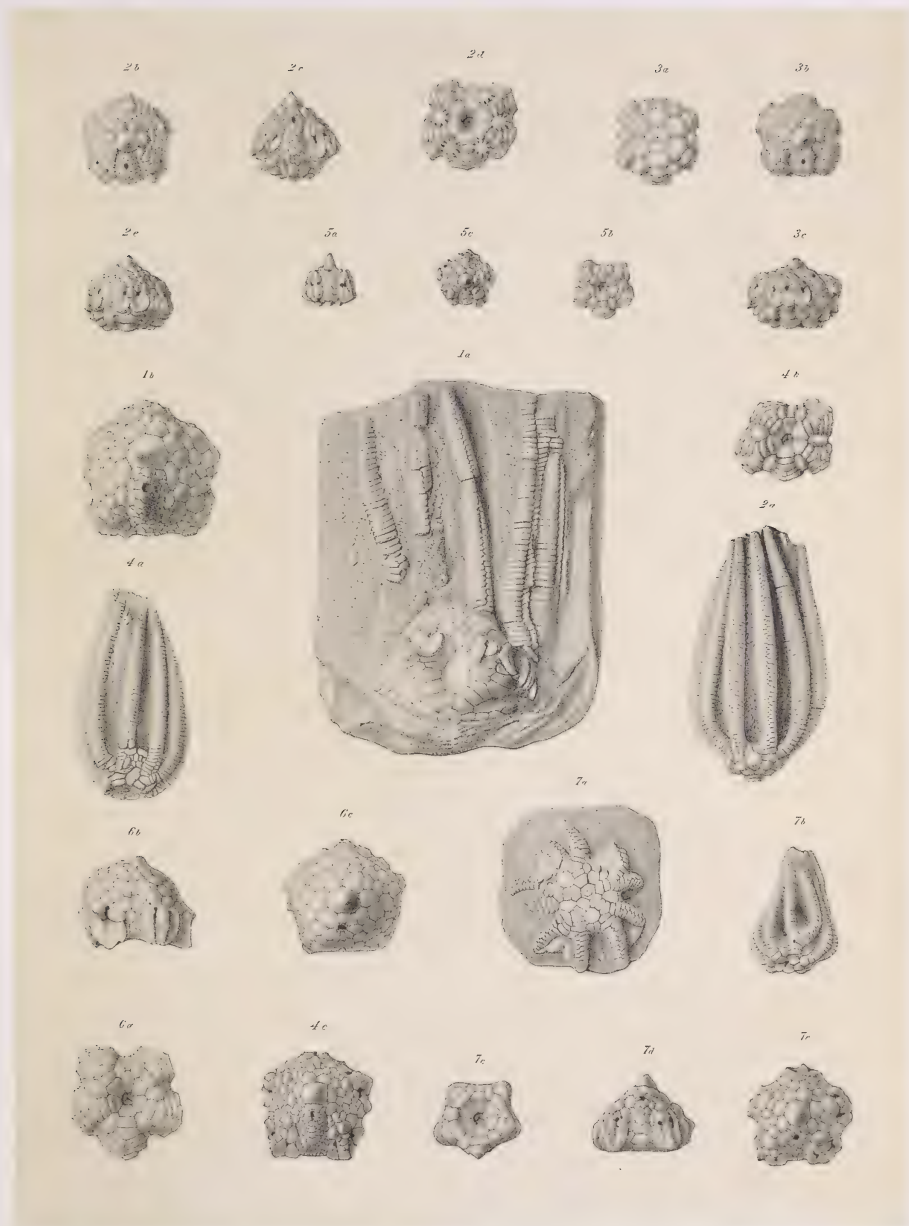




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(All figures from specimens in the collection of Wachsmuth and Springer.)







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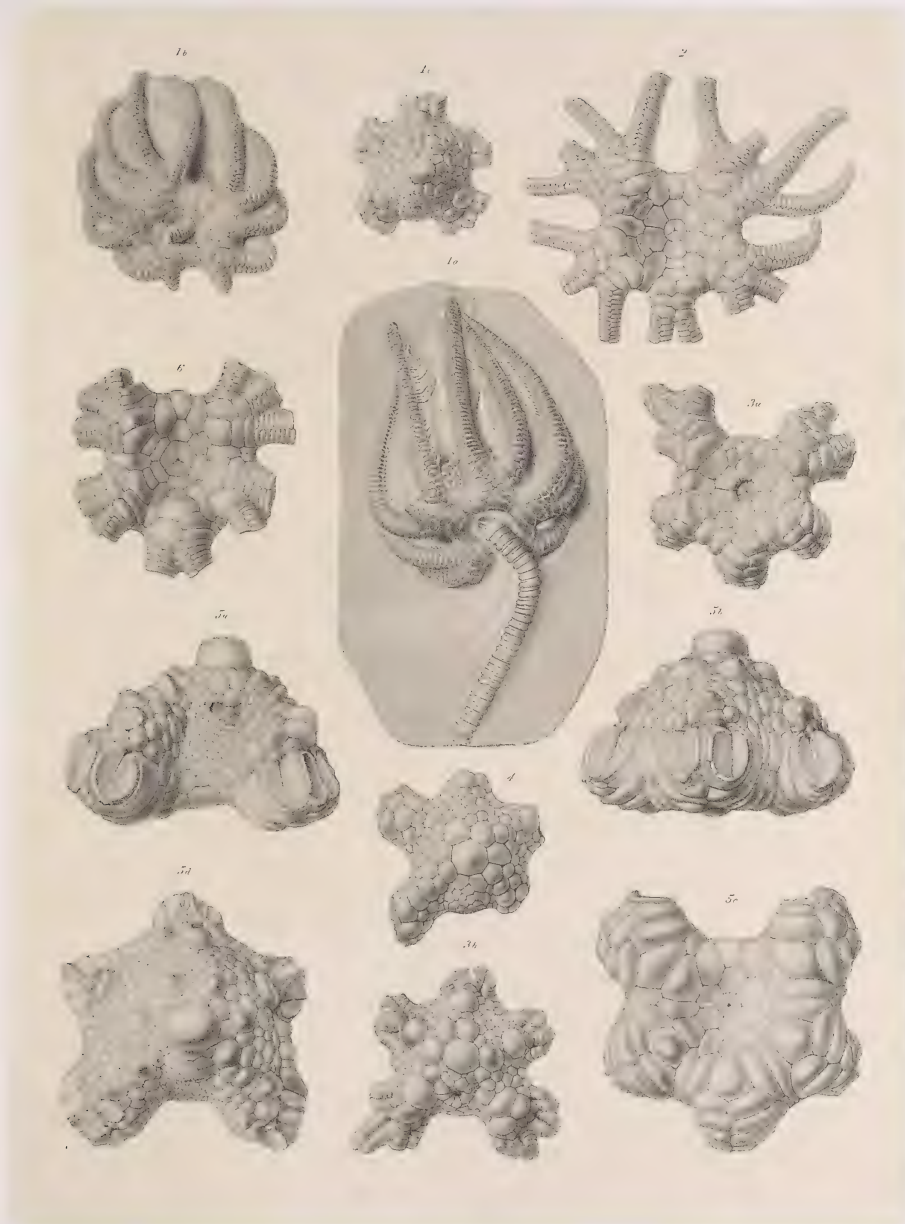






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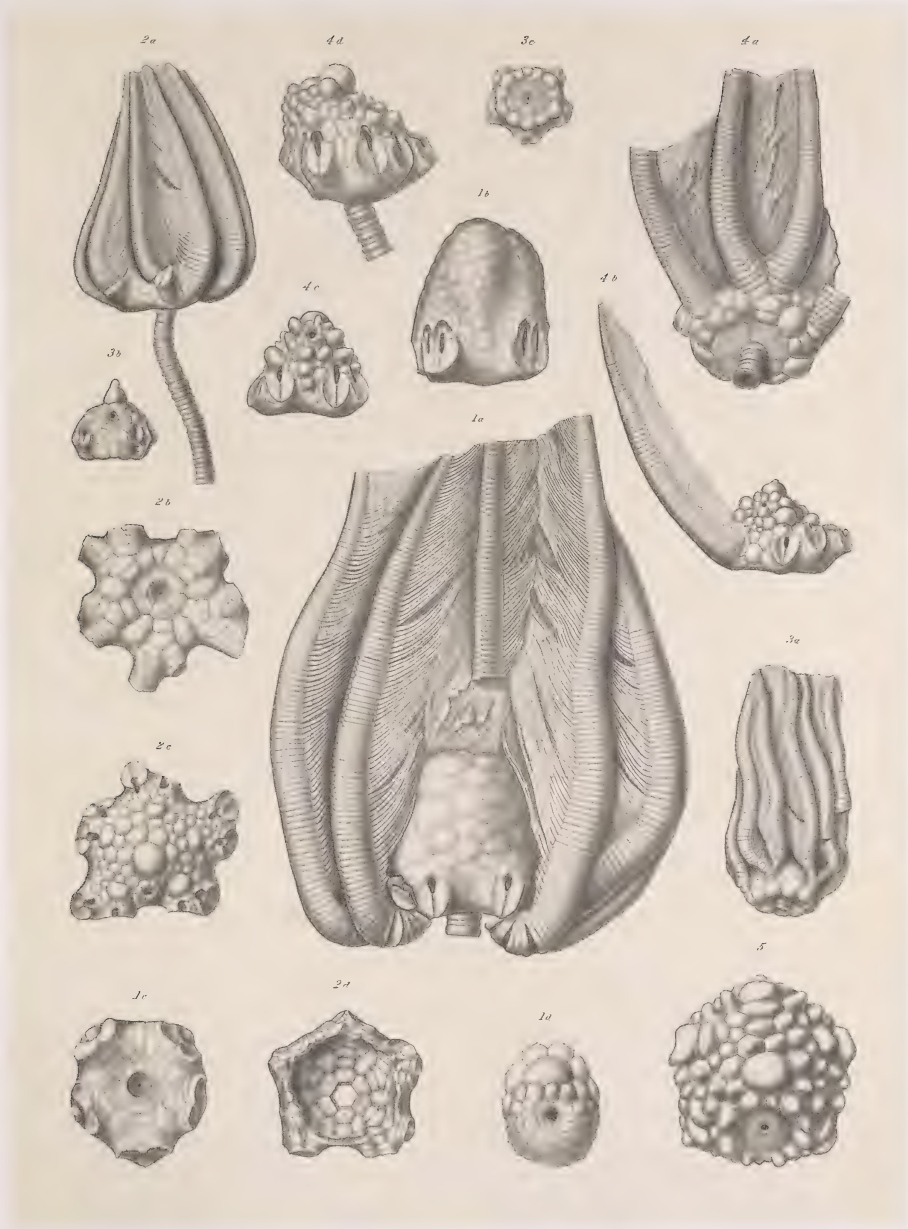




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(All specimens in the collection of Wachsmuth and Springer.)





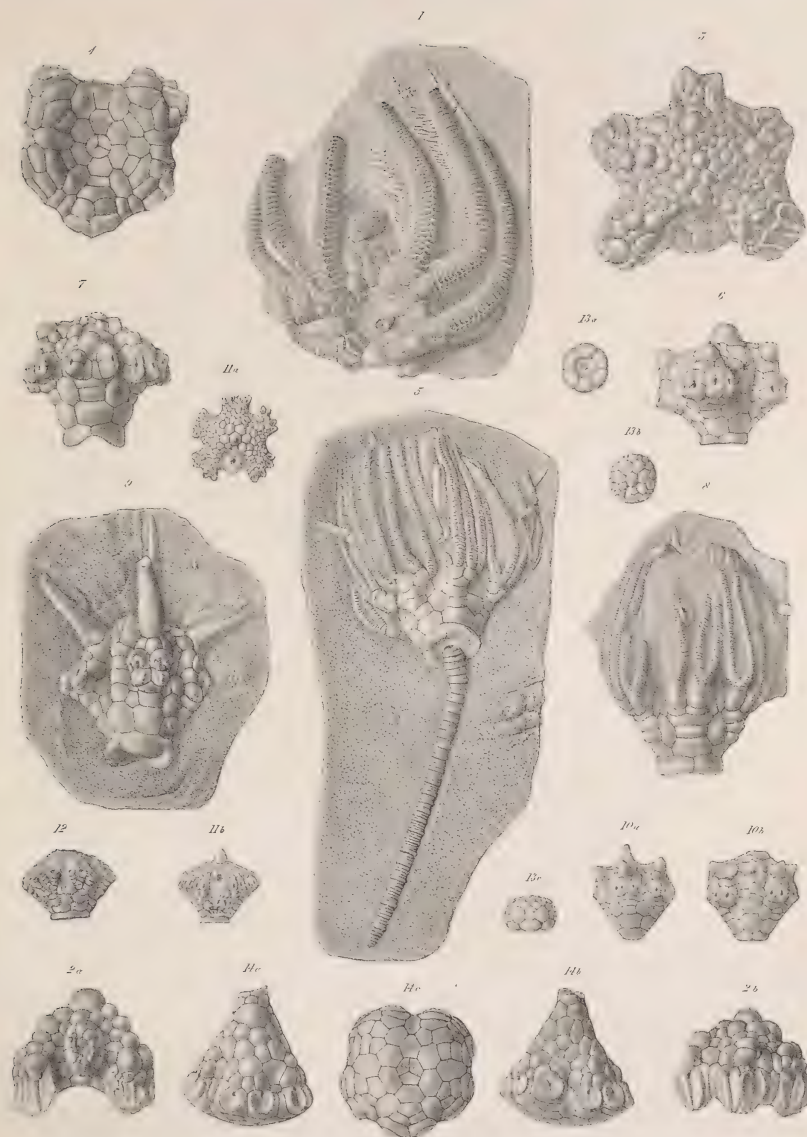




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(All specimens in the collection of Wachsmuth and Springer, unless otherwise stated.)







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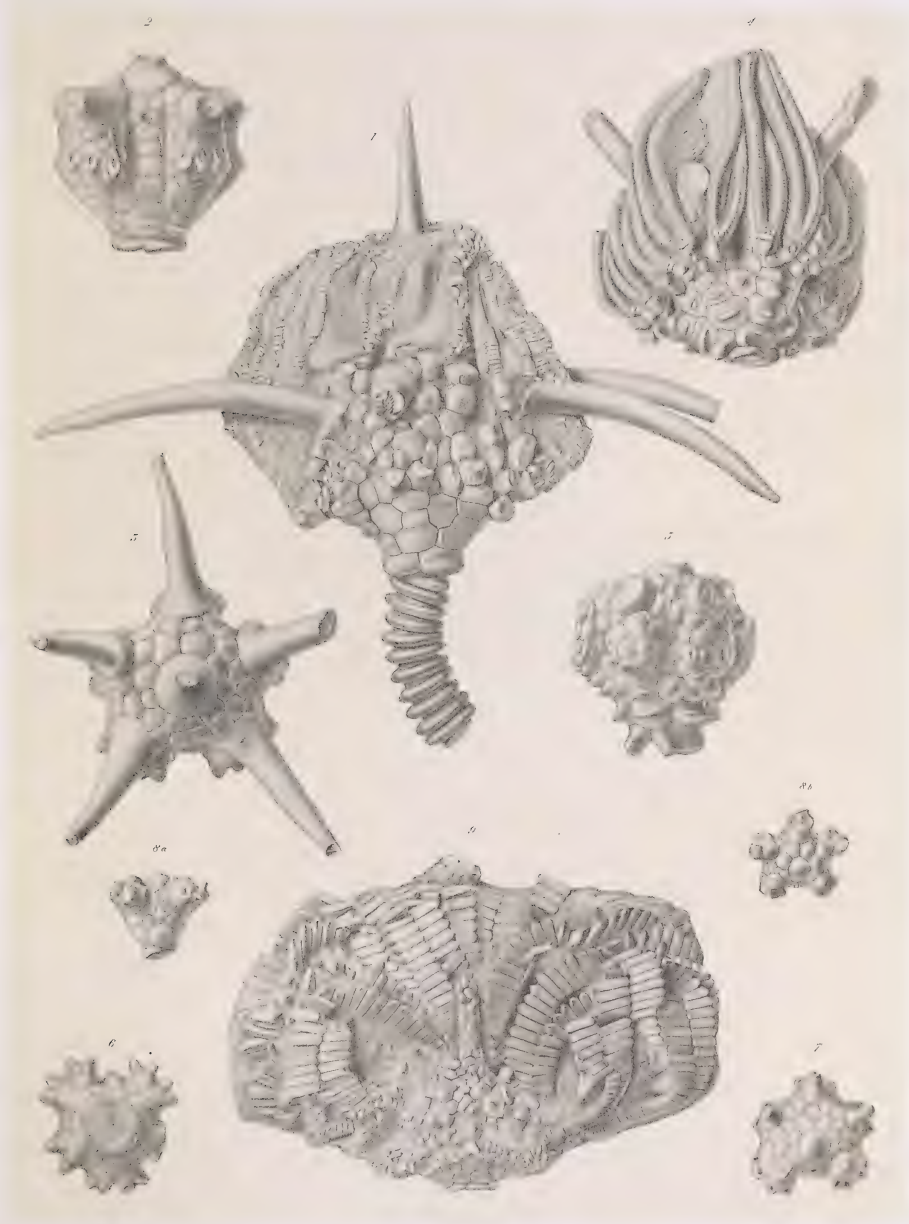






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(All the specimens in the collection of Wachsmuth and Springer.)	



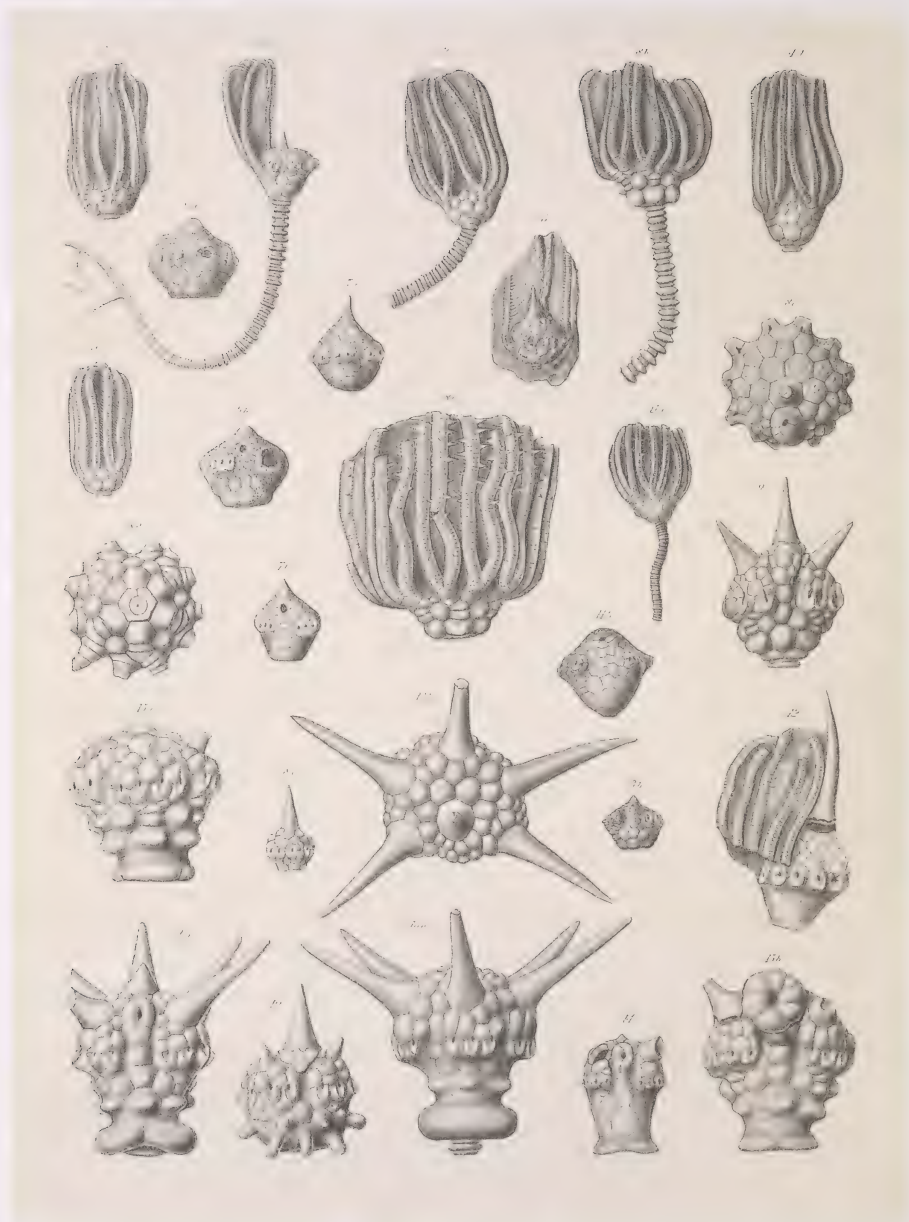
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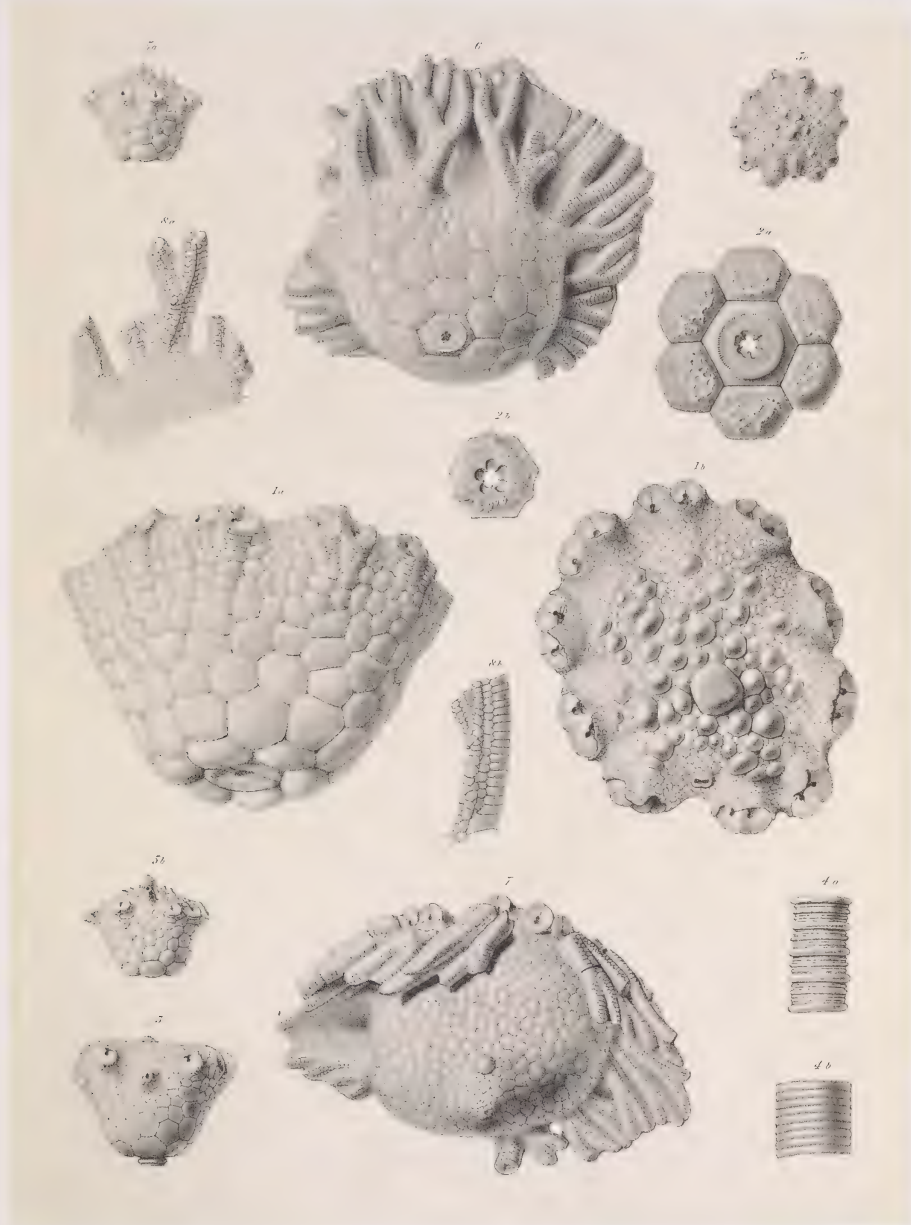






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(All the specimens are in the collection of Wachsmuth and Springer.)	

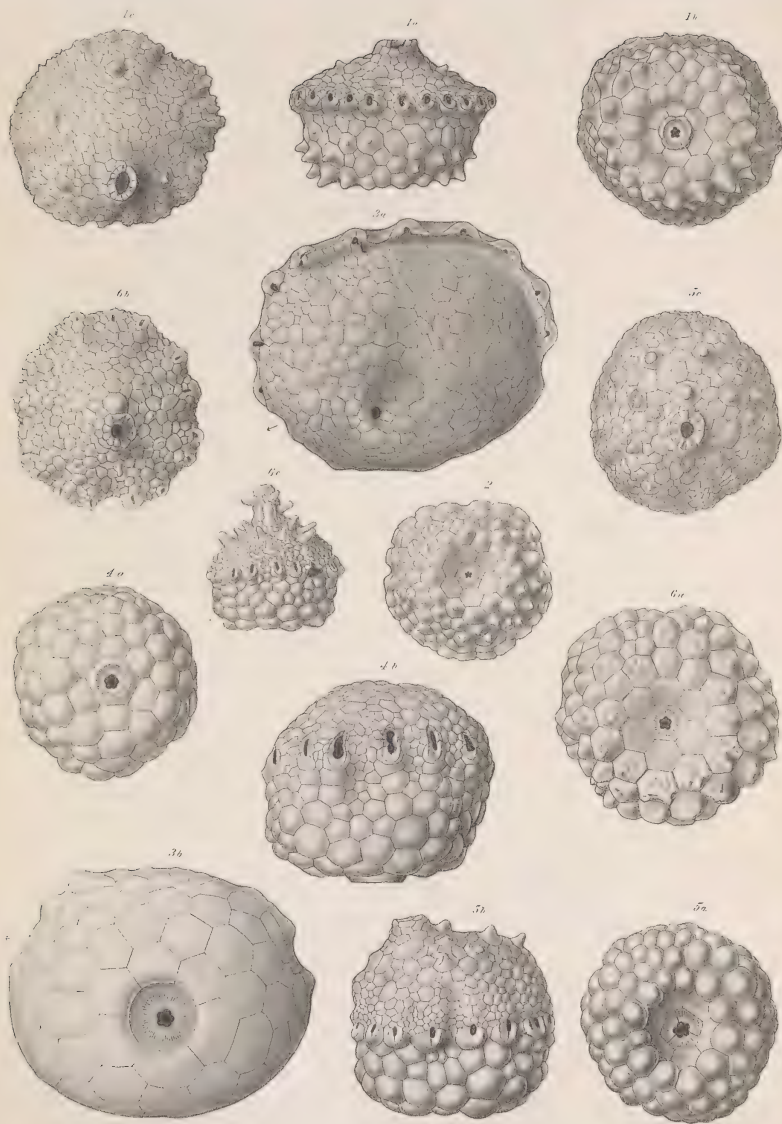






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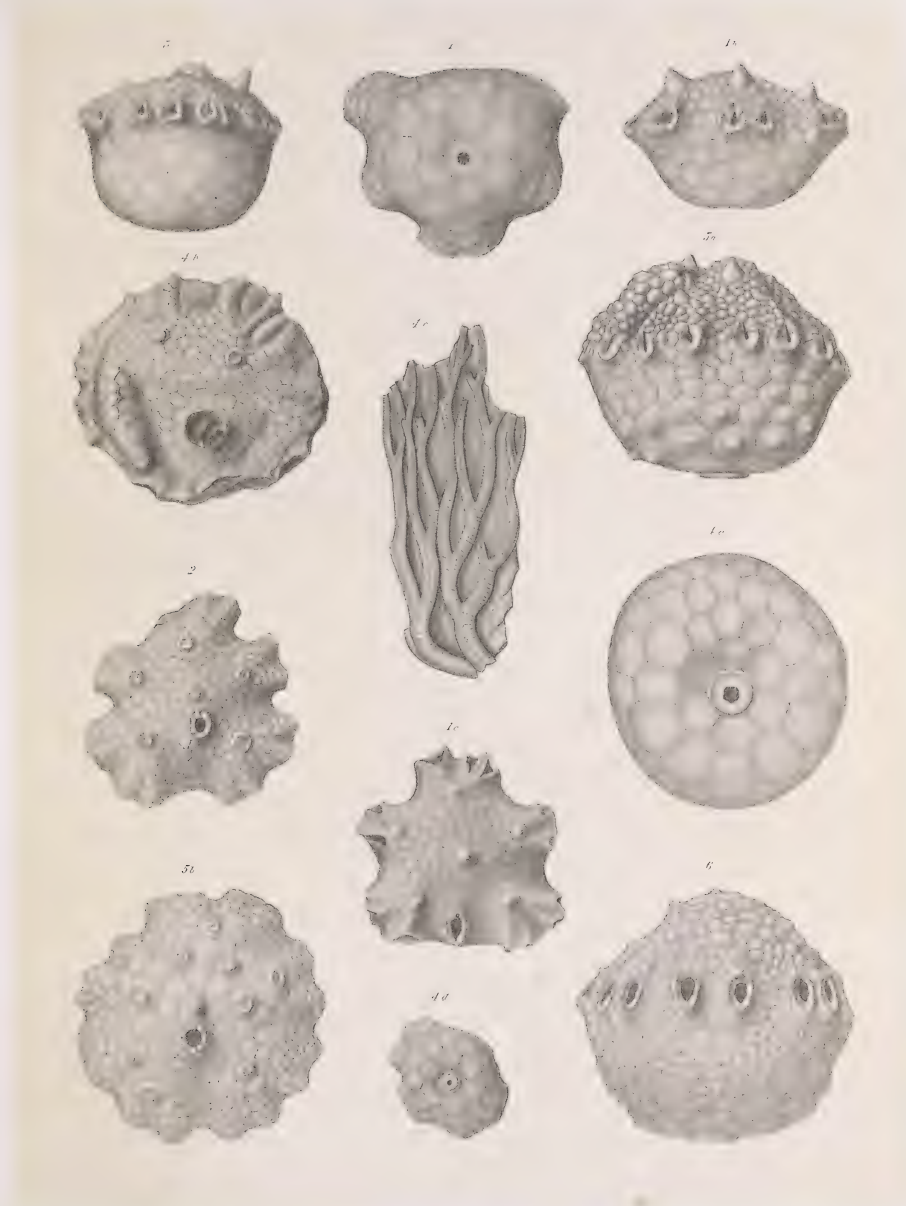






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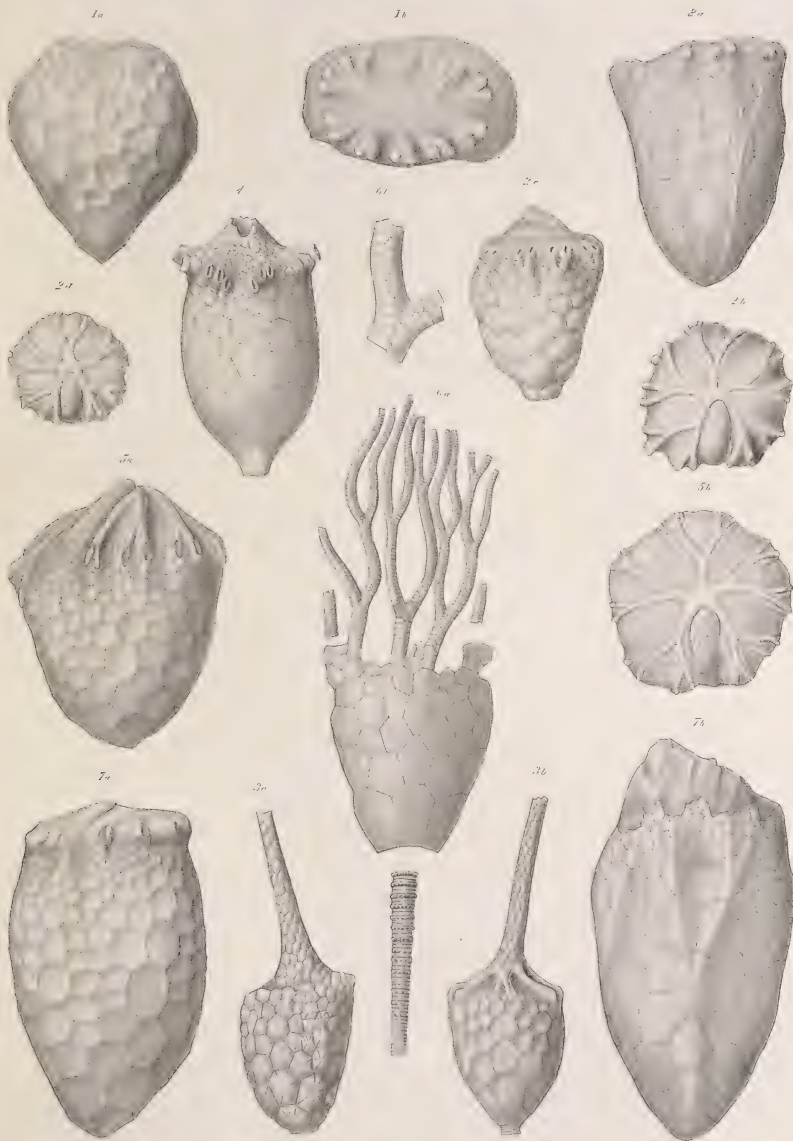




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5 <i>a</i> . Posterior view of an internal cast. (Coll. W. C. Egan.)	
5 <i>b</i> . Ventral aspect of another cast. (Same collection.)	
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7 <i>b</i> . Anterior view of the dorsal cup. (Same collection.)	









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PERIECHOCRINUS TENUIDISCUS (Hall) . . . . .	531
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8. A young specimen. (Type of <i>Megistocrinus parvus</i> .)	
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(All specimens, except 2a and b, in the collection of Wachsmuth and Springer.)	



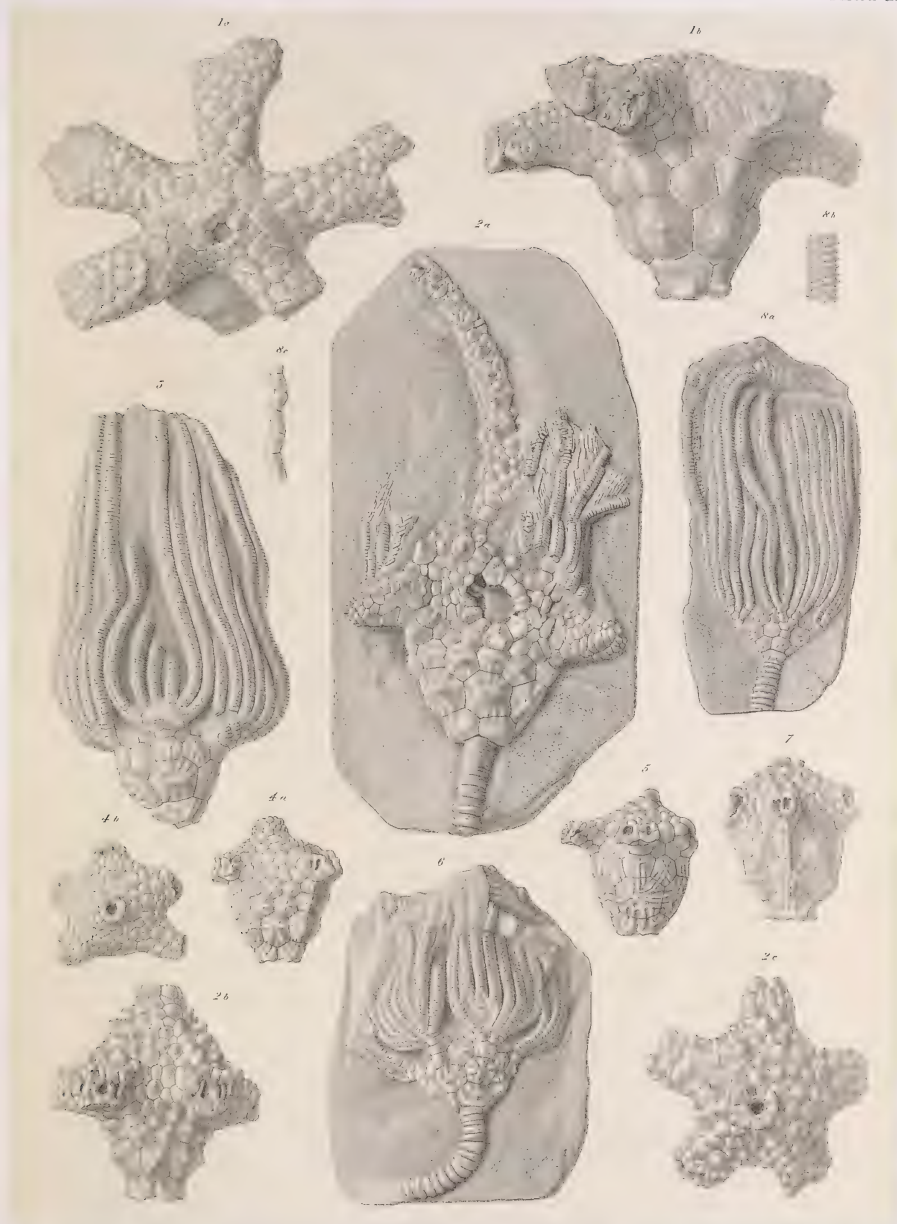






# PLATE LII.

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1b. Anterior view of the same.	
ACTINOCRINUS VERRUCOSUS Hall . . . . .	558
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8b. The structure at the upper part of the arms.	
8c. The proximal arm plates (enlarged.)	
(All the specimens in the collection of Wachsmuth and Springer.)	

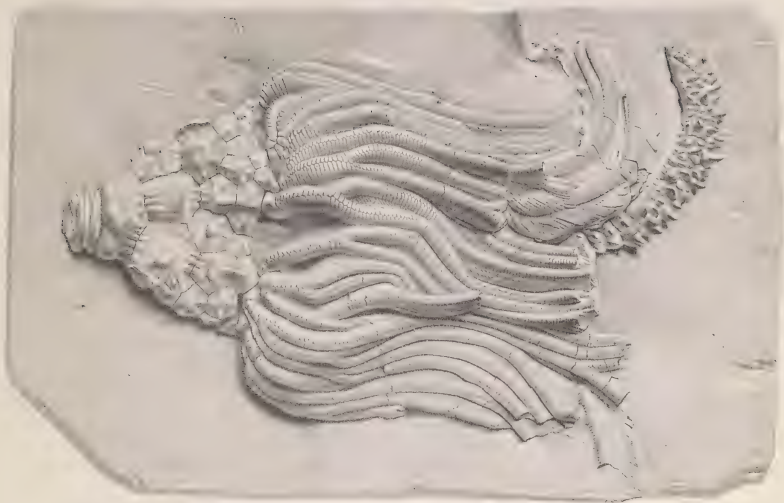






# PLATE LIII.

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Fig. 1. A magnificent specimen with arms and anal tube.	
ACTINOCRINUS MAGNIFICUS W. and Sp. . . . .	567
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(Both in the collection of Wachsmuth and Springer.)	



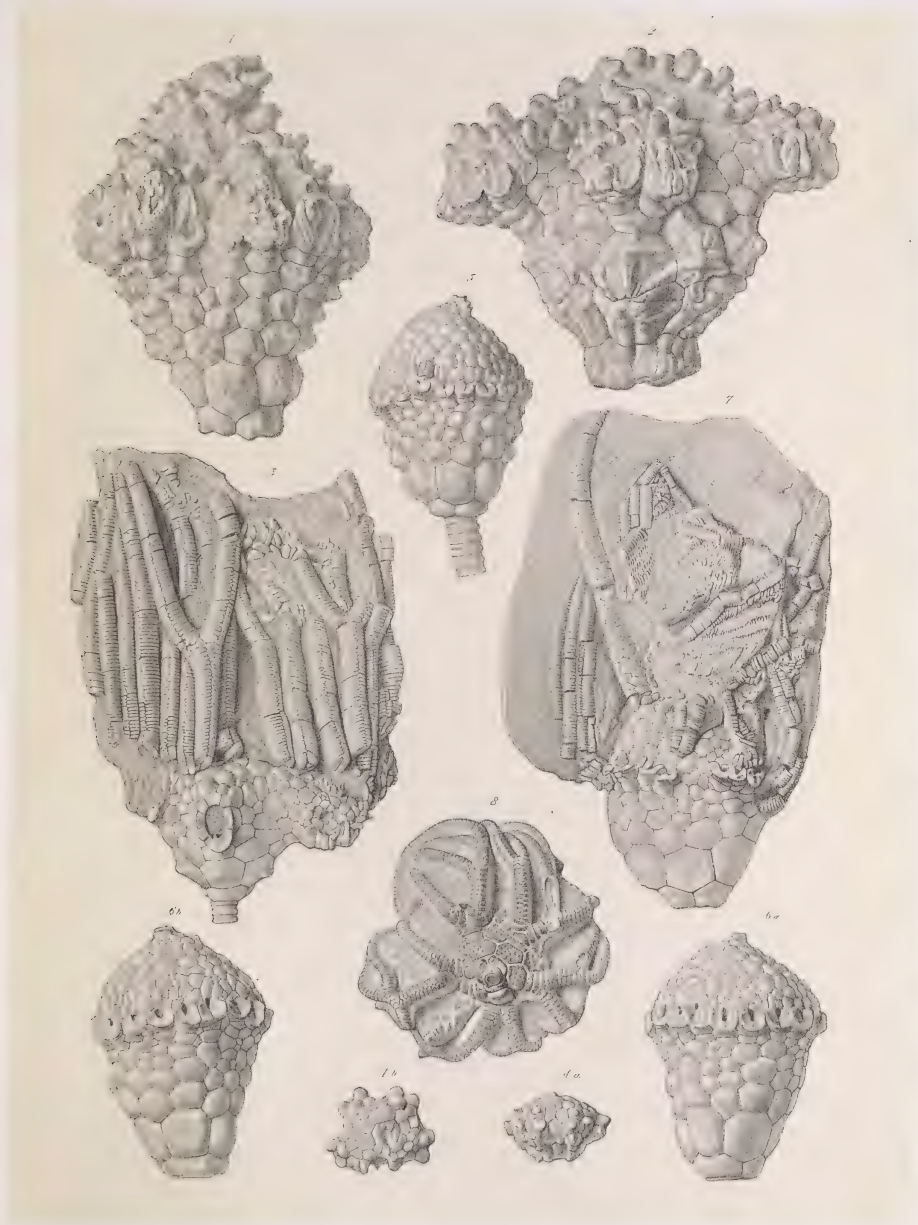






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7. Hall's type of <i>Actinocrinus eryx</i> . (Mus. Comp. Zool.)	
AMPHORACRINUS VIMINALIS (HALL) . . . . .	590
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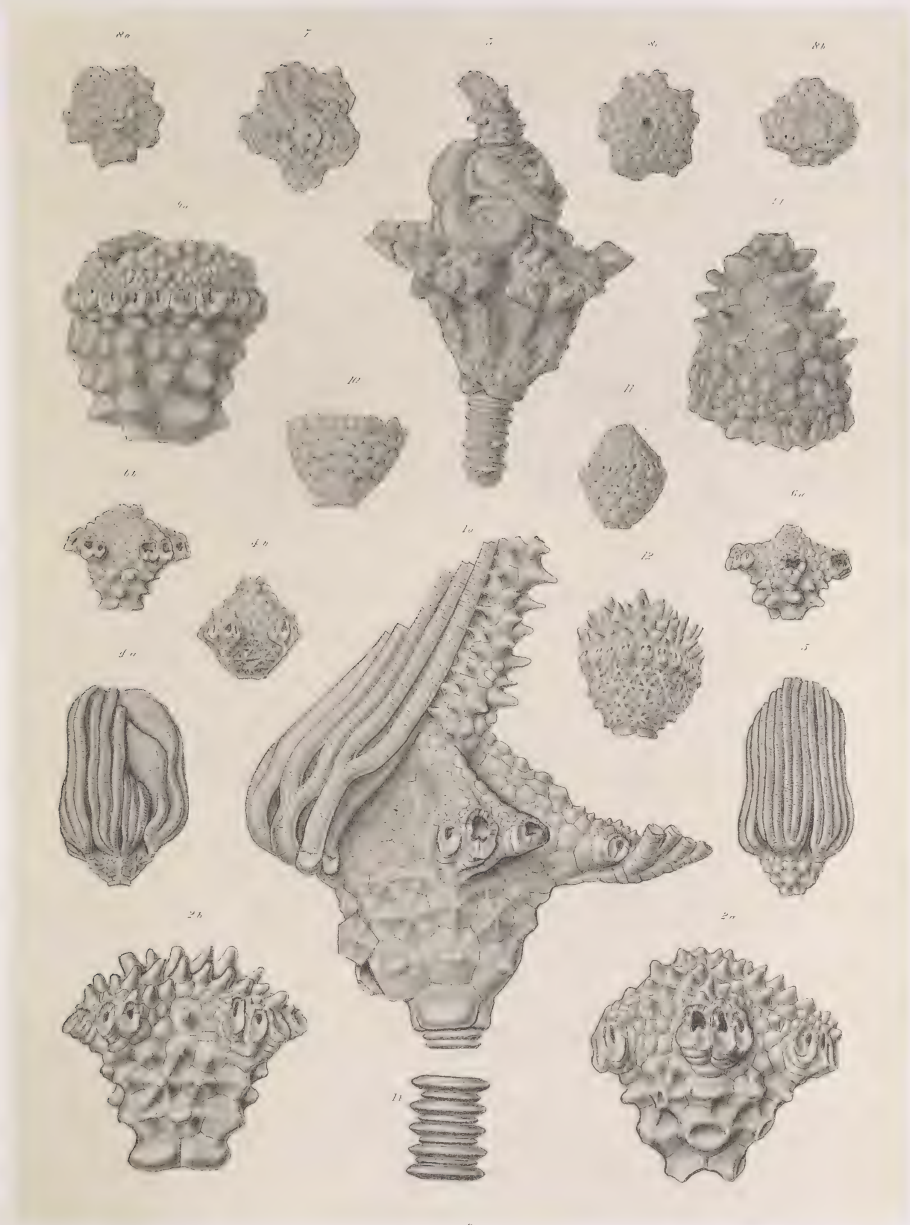






# PLATE LV.

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Fig. 1a. Posterior view of a fine specimen; showing portions of anal tube and arms. (Coll. W. and Sp.)	
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ACTINOCRINUS TENUISCULPTUS McChesney . . . . .	571
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ACTINOCRINUS SCITULUS M. and W. . . . .	559
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ACTINOCRINUS ARROSUS (S. A. Miller). . . . .	577
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12. The type specimen, showing the posterior side of the calyx. (After Miller.)	



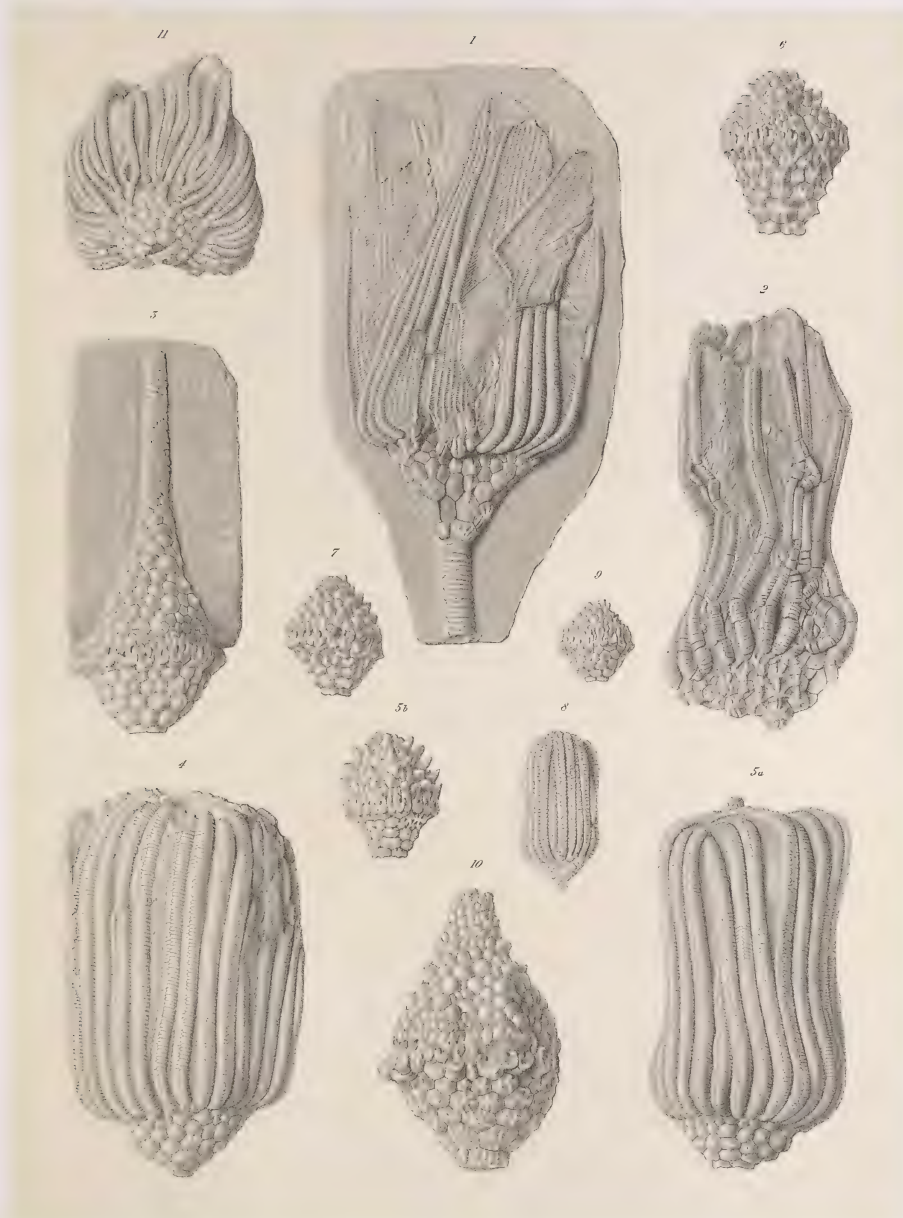






# PLATE LVI.

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ACTINOCRINUS DAPHNE (Hall) . . . . .	574
Fig. 1. Posterior view of a large specimen. (Coll. W. and Sp.)	
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CACTOCRINUS THETIS (Hall) . . . . .	614
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5b. Calyx, showing the left posterior ray and the anal interradius. (Coll. W. and Sp.)	
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ACTINOCRINUS GRACILIS W. and Sp. . . . .	572
11. A specimen with arms ( $\frac{1}{2}$ ). (Mus. Comp. Zoöl.)	





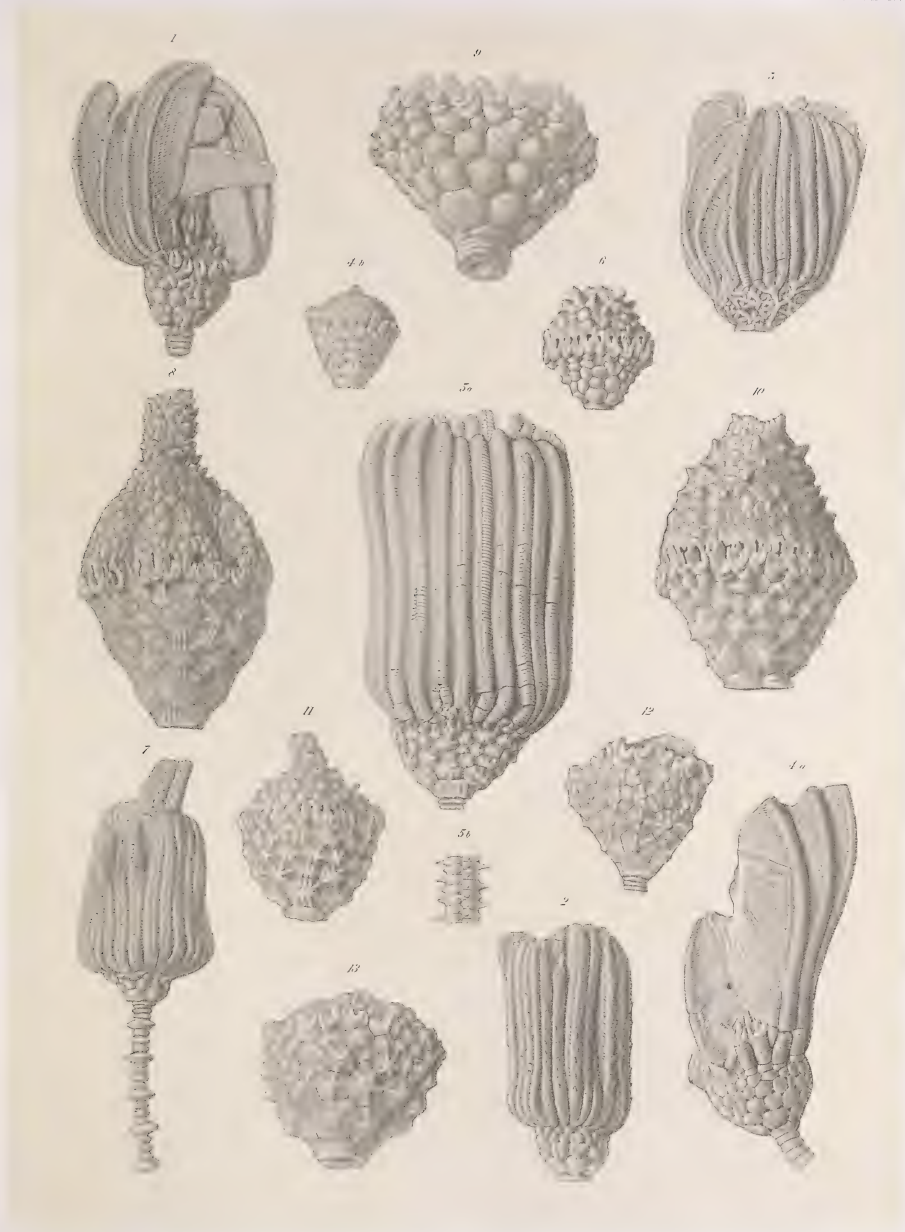


# PLATE LVII.

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CACTOCRINUS NODOBRACHIATUS W. and Sp. . . . .	622
Fig. 1. Posterior side of a fine specimen with arms; the arms incurving and touching the summit of the disk.	
2. Anterior view of another specimen.	
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CACTOCRINUS ARNOLDI W. and Sp. . . . .	624
4a. Specimen with arms and pinnules (the nodes upon the arms are not preserved.)*	
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CACTOCRINUS LONGUS (Meek and Worthen) . . . . .	609
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CACTOCRINUS CLARUS (Hall) . . . . .	612
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13. Another specimen, showing the left posterior ray and anal interradius.	
(All the specimens in the collection of Wachsmuth and Springer.)	

\* This figure is misleading in giving the appearance of spines to some arm-fragments lying upon the disk.





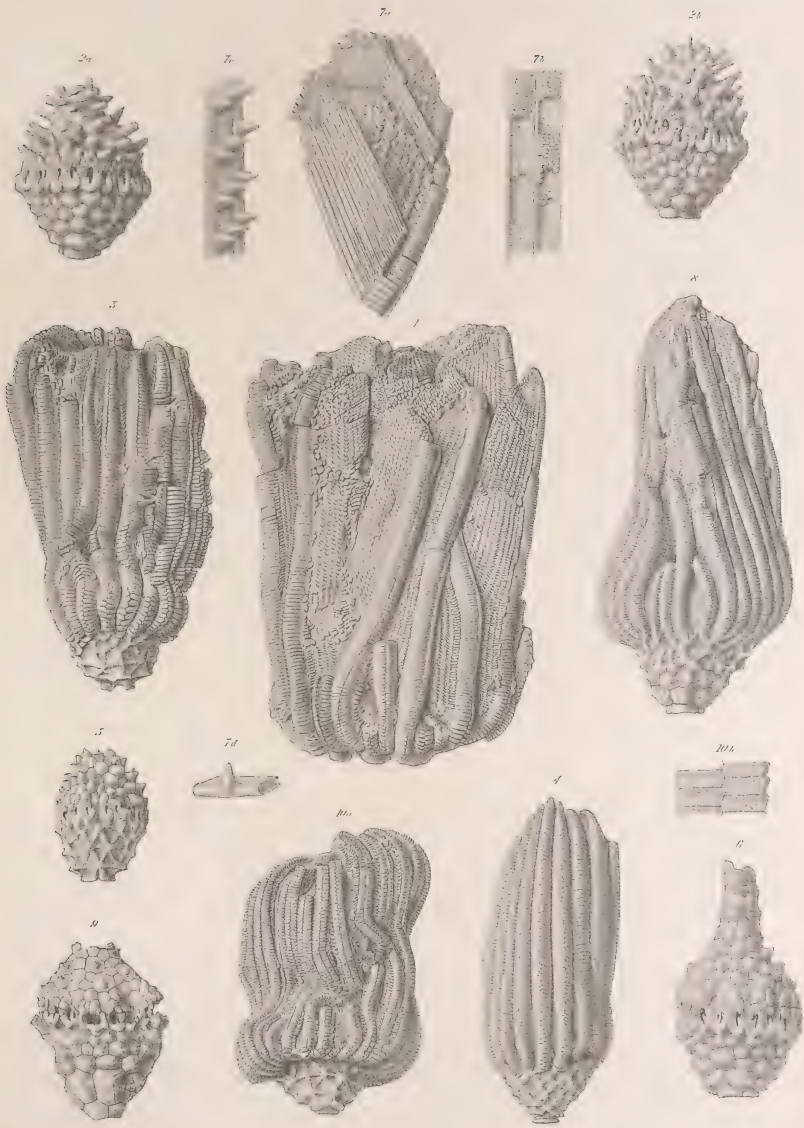




# PLATE LVIII.

	PAGE
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Fig. 1. Showing the arm structure, and the arrangement of the hooks along the pinnules.	
CACTOCRINUS RETICULATUS (Hall) . . . . .	605
2a. Anterior view of the calyx.	
2b. Posterior view of the calyx.	
CACTOCRINUS PROBOSCIDALIS (Hall) . . . . .	601
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7b. The ventral side of the pinnules still more enlarged, showing the arrangement of the covering plates and side pieces, and also at intervals the bottom of the food grooves.	
7c. Dorsal aspect of three adjoining pinnules greatly enlarged.	
7d. A single pinnule joint, greatly enlarged.	
CACTOCRINUS MULTIBRACHIATUS (Hall) . . . . .	617
8. Anterior side of a fine specimen with arms.	
CACTOCRINUS LIMABRACHIATUS (Hall) . . . . .	608
9. Lateral view of the calyx (one of the rays abnormal, having but one costal).	
10a. Specimen with arms.	
10b. Arm joints, much enlarged.	

(All the specimens in the collection of Wachsmuth and Springer.)





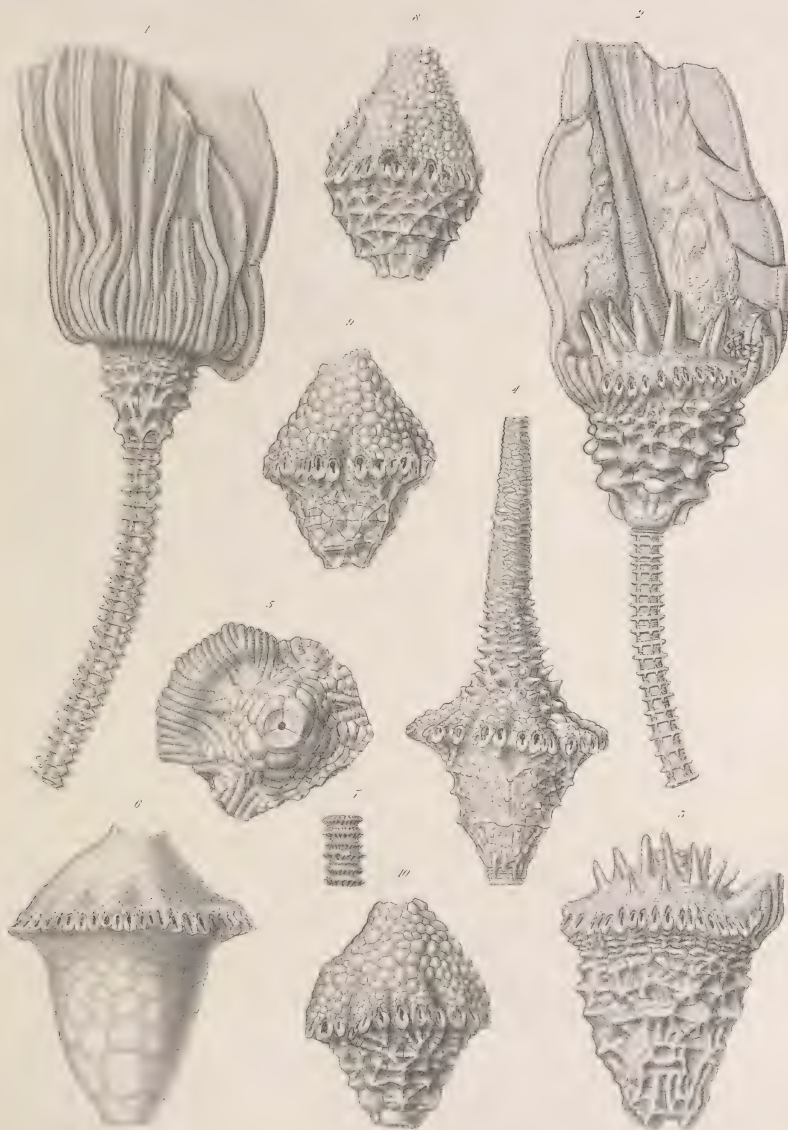




# PLATE LIX.

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TELEIOCRINUS RUDIS (Hall) . . . . .	630
Fig. 1. Specimen with arms and stem.	
2. Anterior view of a specimen with arms, anal tube, and stem.	
3. Lateral view of the calyx (a very large specimen).	
TELEIOCRINUS ADOLESCENS W. and Sp. . . . .	635
4. Side view of the type specimen.	
TELEIOCRINUS TENUIRADIATUS (Hall) . . . . .	634
5. Dorsal aspect of a specimen with arms.	
6. Anterior side of a large calyx.	
TELEIOCRINUS UMBROSUS (Hall) : . . . . .	628
7. Portion of the stem.	
CACTOCRINUS CÆLATUS (Hall) . . . . .	618
8. Lateral view of the calyx; typical form.	
9. Posterior view of a slightly lobed specimen.	
CACTOCRINUS CÆLATUS, var. SPINOTENTACULUS (Hall) . . . . .	619
10. Anterior view of the calyx.	

(All specimens in the collection of Wachsmuth and Springer.)

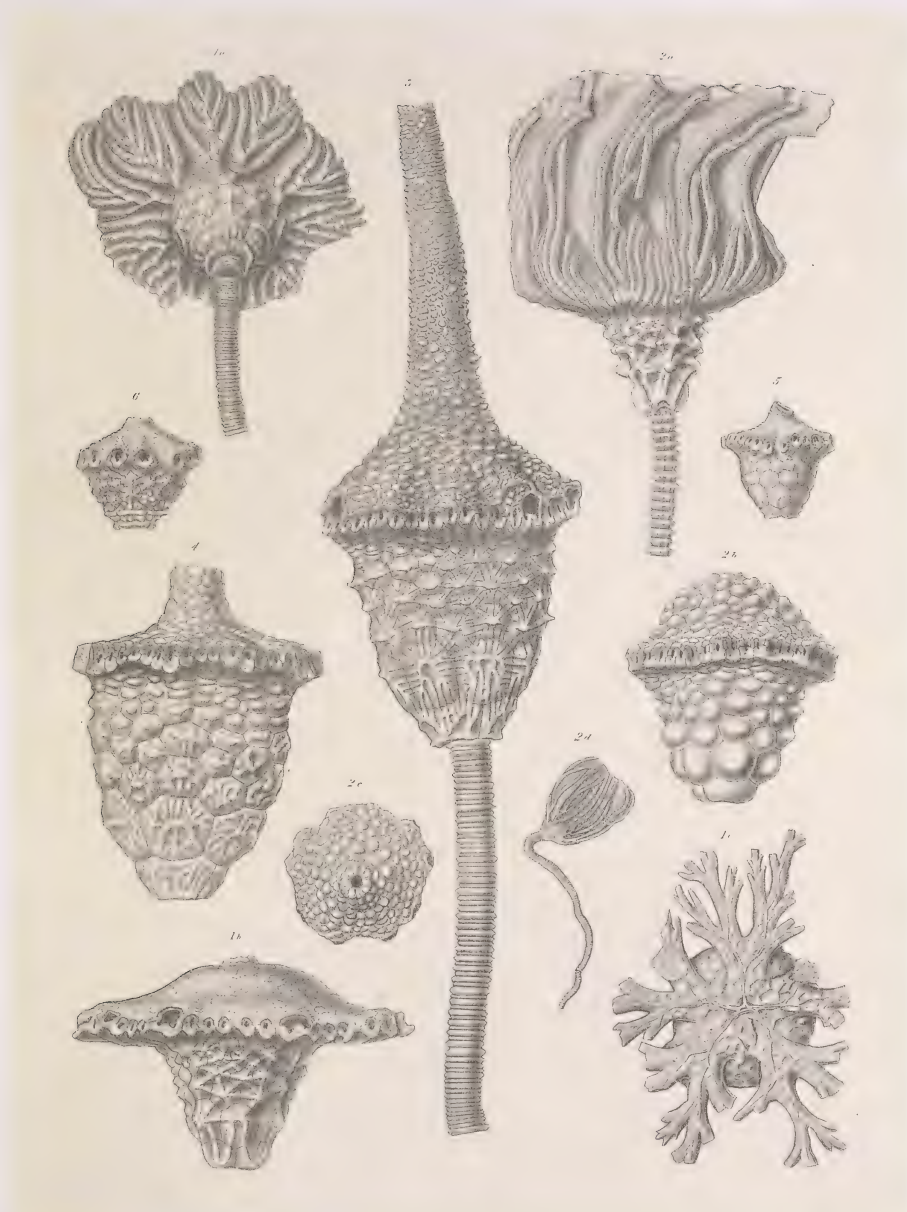






# PLATE LX.

	PAGE
STROTOCRINUS GLYPTUS (Hall) . . . . .	640
Fig. 1a. Specimen with arms and stem.	
1b. Posterior view of a very large specimen.	
1c. Ventral aspect of a natural cast.	
TELEIOCRINUS UMBROSUS (Hall) . . . . .	628
2a. A fine specimen with arms and stem.	
2b. Anterior view of the calyx (typical form).	
2c. Ventral aspect of another specimen.	
2d. A very young specimen; the rays free above the distichals.	
TELEIOCRINUS LIRATUS (Hall) . . . . .	633
3. A large specimen with anal tube and stem.	
TELEIOCRINUS ALTHEA (Hall) . . . . .	632
4. Anterior view of a large calyx.	
ACTINOCRINUS ASPERRIMUS M. and W. . . . .	575
5. Posterior view of the calyx.	
6. Anterior side of the calyx (specimen with unusually strong ridges).	
(All the specimens in the collection of Wachsmuth and Springer.)	





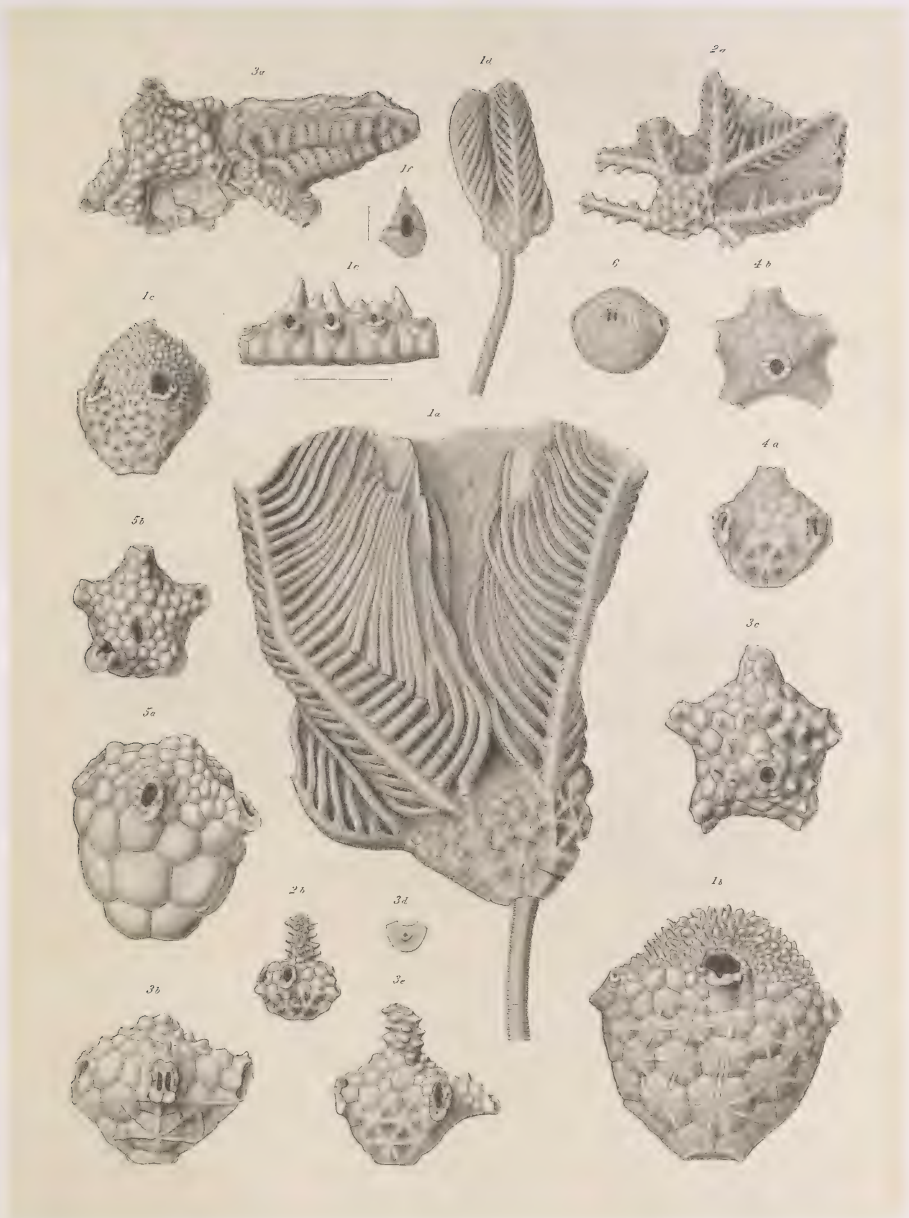




# PLATE LXI.

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STEGANOCRINUS SCULPTUS (Hall) . . . . .	583
Fig. 1 <i>a</i> . Posterior view of a large specimen with arms, anal tube, and stem.	
1 <i>b</i> . Lateral view of a very large calyx.	
1 <i>c</i> . Posterior view of another calyx.	
1 <i>d</i> . Young specimen with arms and column.	
1 <i>e</i> . Portion of one of the tubular appendages, showing the bases of the arms (†).	
1 <i>f</i> . Cross-section of the same (†).	
STEGANOCRINUS ARANEOLUS M. and W. . . . .	581
2 <i>a</i> . Dorsal aspect of a specimen with arms.	
2 <i>b</i> . Lateral view of the calyx, and the lower end of the anal tube.	
STEGANOCRINUS PENTAGONUS (Hall) . . . . .	579
3 <i>a</i> . Ventral aspect of a specimen, showing portions of the arms.	
3 <i>b</i> . Anterior view of a large calyx.	
3 <i>c</i> . Ventral aspect of the same specimen.	
3 <i>d</i> . Distal face of the first distichal (enlarged).	
3 <i>e</i> . Posterior view of a smaller specimen with more regularly arranged covering pieces.	
4 <i>a</i> . Posterior view of a specimen from New Mexico.	
4 <i>b</i> . Ventral aspect of the same specimen.	
STEGANOCRINUS CONCINNUS (Shumard) . . . . .	582
5 <i>a</i> . Lateral view of the calyx.	
5 <i>b</i> . Ventral aspect of a small specimen.	
STEGANOCRINUS GLOBOSUS W. and Sp. . . . .	585
6. Lateral view of the type specimen.	

(All specimens in the collection of Wachsmuth and Springer.)







## PLATE LXII.

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AMPHORACRINUS SPINOBRACHIATUS (Hall) . . . . .	591
Fig. 1. Dorsal aspect of a specimen with a portion of the arms.	
2. Side view of a specimen with arms.	
3. Lateral view of the calyx.	
4. Dorsal aspect of the calyx, showing the ornamentation.	
AMPHORACRINUS DIVERGENS (Hall) . . . . .	588
5. Dorsal aspect of a somewhat distorted specimen with arms.	
6a. Dorsal aspect of a fine specimen with spreading arms.	
6b. A forked oral spine of this specimen.	
7a. Posterior view of a fine specimen, showing the arms and spines surrounding the anus. (The specimen was described by Meek and Worthen as <i>A. divergens</i> , var. <i>multiramosus</i> .)	
7b. Ventral aspect of the same specimen, showing the oral and anal spines.	
8a. Side view of a very small specimen, showing the oral spines.	
8b. Dorsal aspect of the same specimen.	
8c. Ventral aspect of the same, showing the oral and anal spines.	
9. Posterior view of the calyx.	
10. Lateral view of the calyx, showing lower part of anal tube.	

(Figs. 5, 7a, and 7b were made from specimens in the collection of the Mus. Comp. Zool.; the others are in the collection of Wachsmuth and Springer.)



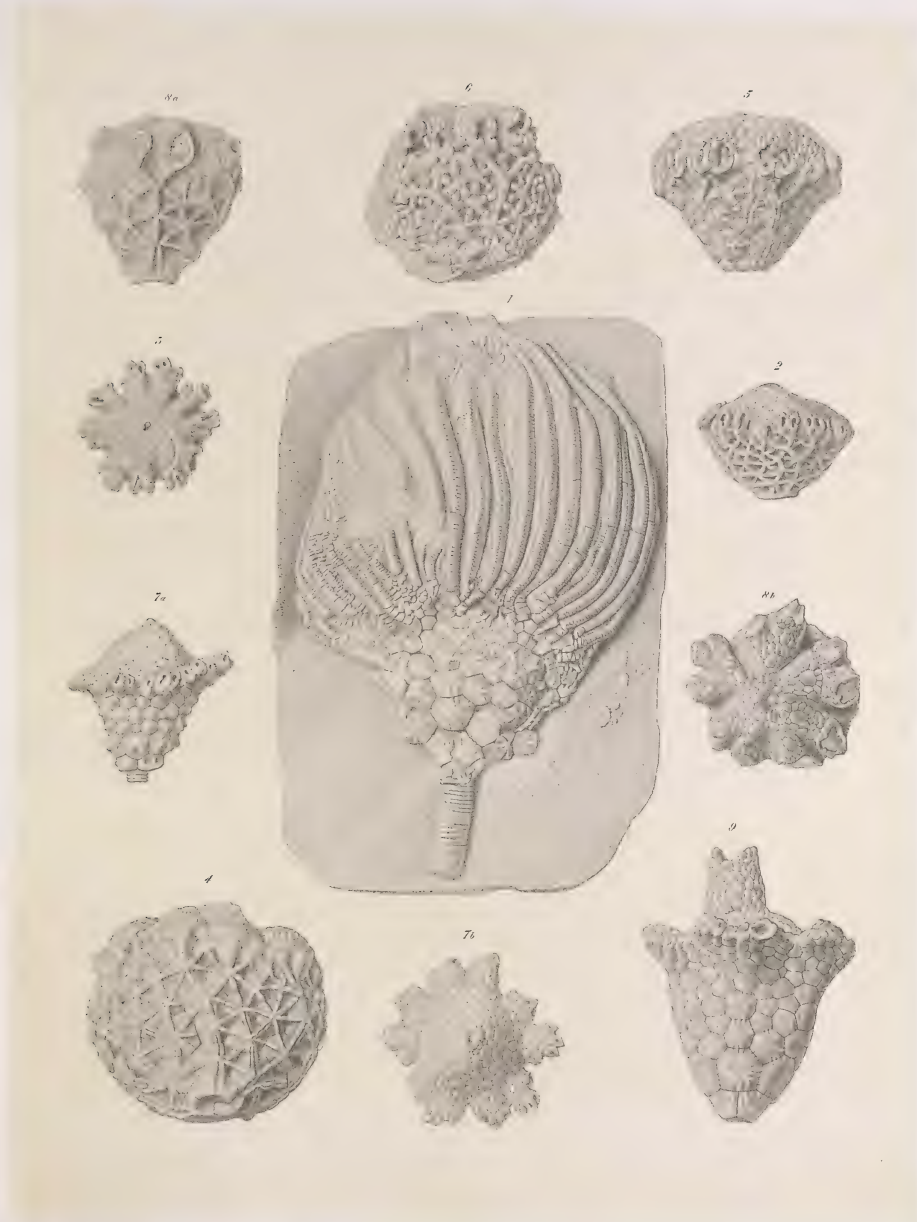






# PLATE LXIII.

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PHYSETOCRINUS ORNATUS (Hall) . . . . .	597
Fig. 1. Antero-lateral view of a specimen with arms. (Coll. W. and Sp.)	
2. Posterior view of the calyx. (Same collection.)	
3. Ventral aspect, showing annular impression made by a <i>Capula</i> , which covered the anal opening. (Same collection.)	
4. Anterior view of a large, slightly crushed specimen. (Same collection.)	
PHYSETOCRINUS COPEI (Miller) . . . . .	598
5. Side view of large specimen. (Same collection.)	
PHYSETOCRINUS VENTRICOSUS (Hall) . . . . .	593
6. Type of the variety <i>internodius</i> Hall. (Mus. Comp. Zool.)	
PHYSETOCRINUS ASPER Meek and Worthen . . . . .	596
7 <i>a</i> . Posterior view of the type specimen. (Mus. Comp. Zool.)	
7 <i>b</i> . Ventral aspect of the same.	
PHYSETOCRINUS LOBATUS W. and Sp. . . . .	599
8 <i>a</i> . Side view of the calyx. (Coll. W. and Sp.)	
8 <i>b</i> . Ventral aspect of the calyx. (Same collection.)	
TELEIOCRINUS ALTHEA (Hall) . . . . .	632
9. Lateral view of the type specimen. (Mus. Comp. Zool.)	







# PLATE LXIV.

PHYSETOCRINUS VENTRICOSUS (Hall) . . . . . PAGE  
593

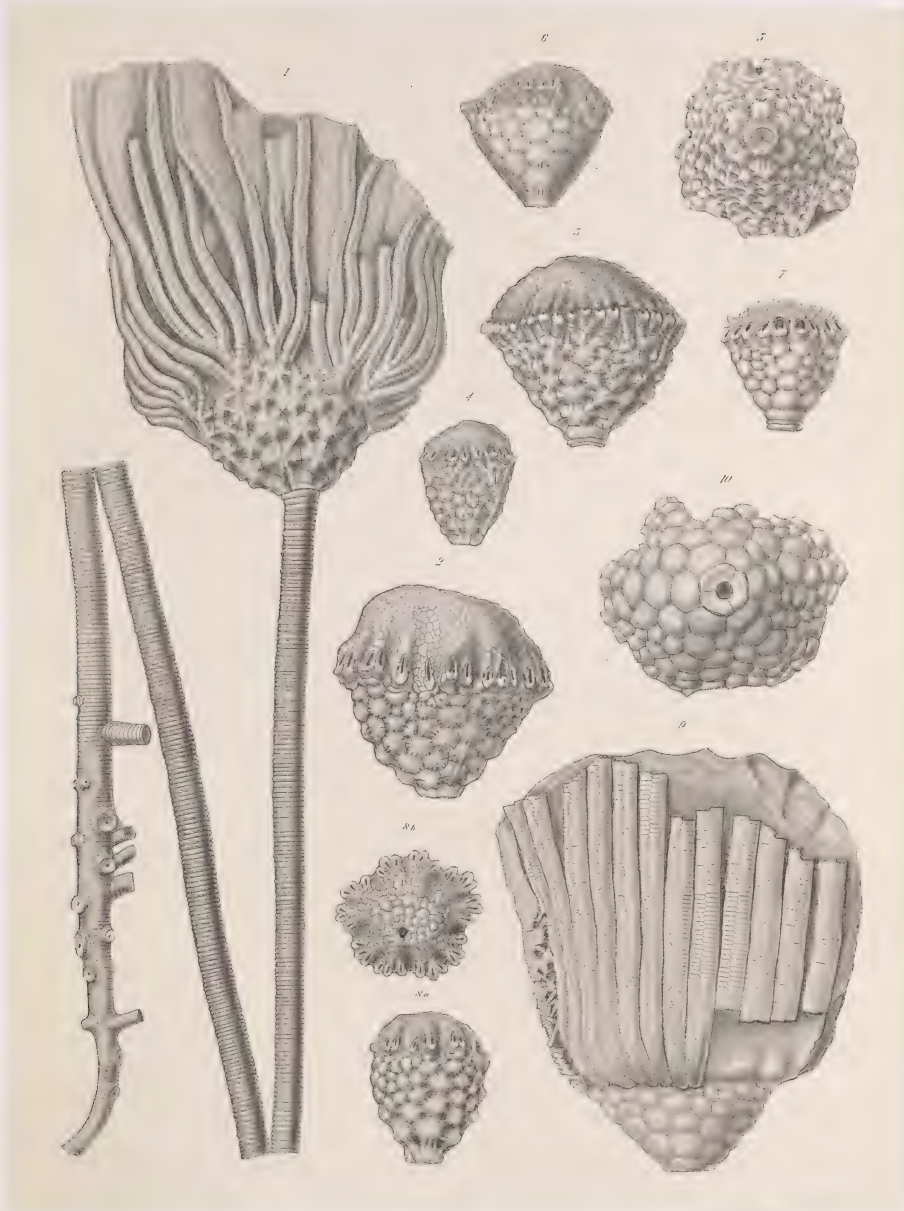
- Fig. 1. Specimen with arms, stem, and root.
- 2. Lateral view of the calyx.
- 3. Anterior view of the calyx.
- 4. Posterior view of a small elongate specimen.
- 5. Dorsal aspect of a depressed specimen of Hall's variety "*Actinocrinus*" *reticulatus*.
- 6. Anterior view of the calyx.
- 7. Anterior view of a specimen of the type of McChesney's "*Actinocrinus*" *subventricosus*.
- 8a. Specimen from the Lower Burlington limestone.
- 8b. Ventral aspect of the same specimen.

PHYSETOCRINUS DILATATUS M. and W. . . . . 595

- 9. The type specimen. (After Meek and Worthen.)
- 10. Dorsal aspect of another specimen.

(All specimens, except Fig. 9, in the collection of Wachsmuth and Springer.)





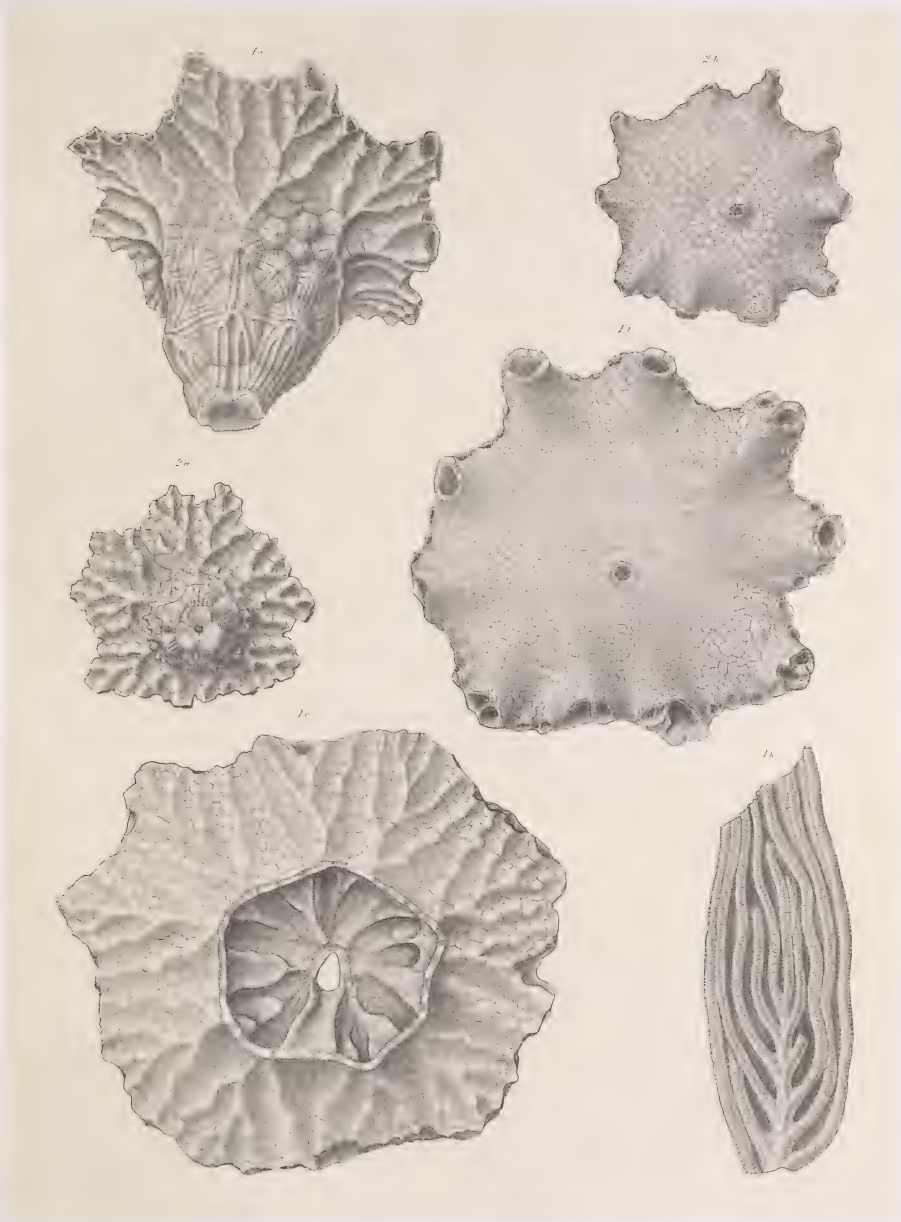




# PLATE LXV.

		PAGE
	STROTOCRINUS REGALIS (Hall) . . . . .	638
Fig. 1a.	Lateral view of the calyx.	
1b.	Half of a ray to the fifth bifurcation, drawn from a large specimen.	
1c.	The extended rim of a large specimen, having portions of the dorsal cup broken away, exposing the subtegmenal galleries at the inner floor of the tegmen, and the grooves passing out from the centre and diverging to the arms.	
1d.	Specimen showing the outer face of the tegmen.	
	STROTOCRINUS GLYPTUS (Hall) . . . . .	640
2a.	Dorsal aspect of a medium-sized specimen.	
2b.	Tegmen of another specimen.	

(All specimens in the collection of Wachsmuth and Springer.)









# PLATE LXVI.

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PLATYCRINUS HEMISPHERICUS M. and W. . . . .	703
Fig. 1a. Specimen showing arms and stem.	
1b. Dorsal aspect of another specimen with arms spreading, and a <i>Platyceras</i> <i>infundibulum</i> covering anal opening.	
1c. Lateral view of the calyx; also a <i>Platyceras infundibulum</i> attached.	
1d. Ventral aspect of another specimen.	
PLATYCRINUS SUBSPINULOSUS Hall . . . . .	684
2a. Lateral view of the dorsal cup; a very large specimen.	
2b. Base of the same specimen.	
PLATYCRINUS VERRUCOSUS White . . . . .	705
3a. Lateral view of the dorsal cup.	
3b. Dorsal aspect of the same.	
PLATYCRINUS EXCAVATUS Hall . . . . .	718
4. A specimen with arms. (The figure does not show sufficiently the abrupt depressions on the radials just below their facets.)	
PLATYCRINUS NODO-STRIATUS W. and Sp. . . . .	698
5a. Dorsal aspect.	
5b. Side view of a somewhat depressed specimen.	
PLATYCRINUS YANDELLI O. and Sh. . . . .	706
6a. Dorsal aspect of a specimen with arms.	
6b. Posterior view of calyx.	
6c. Ventral aspect of the same specimen.	
PLATYCRINUS SPINIFER W. and Sp. . . . .	708
7. The type specimen with arms.	
PLATYCRINUS ORNIGRANULUS McChesney . . . . .	701
8. A specimen with arms.	
PLATYCRINUS SUBSPINOSUS Hall . . . . .	717
9a. Dorsal aspect of a perfect specimen with arms. (Mus. Comp. Zool.)	
9b. Ventral aspect of the calyx.	
PLATYCRINUS DISCOIDEUS O. and Sh. . . . .	713
10a. Dorsal aspect of a specimen with arms, the outer parts of the latter slightly restored in two rays.	
10b. Ventral aspect of the calyx.	
10c. Posterior side of the same specimen.	
(All specimens, except Fig. 9a, in the collection of Wachsmuth and Springer.)	







# PLATE LXVII.

	PAGE
PLATYCRINUS SAFFORDI Hall . . . . .	694
Fig. 1. A fine specimen with arms and column, from Indian Creek, Ind. (Coll. W. and Sp.)	
2. Side view of the calyx. (Same collection.)	
3. Dorsal cup of a specimen from Burlington. (Same collection.)	
PLATYCRINUS GLYPTUS M. and W. . . . .	693
4. Specimen with arms and column. (Coll. W. and Sp.)	
5. Dorsal cup of a large, elongate specimen. (Same collection.)	
PLATYCRINUS INCOMPTUS White . . . . .	664
6. A young specimen with arms, showing the numerous bifurcations of the rays, and a faint rugose ornamentation.	
PLATYCRINUS SPINIFER, var. ELONGATUS W. and Sp. . . . .	709
7. Lateral view of the calyx, showing portions of the arms. (Same collection.)	
PLATYCRINUS CAVUS Hall . . . . .	715
8a and b. Dorsal cup of two specimens. (Same collection.)	
PLATYCRINUS WORTHENI Hall . . . . .	702
9. The type specimen. (Illinois State collection.)	
PLATYCRINUS GEOMETRICUS W. and Sp. . . . .	697
10. The type specimen. (Mus. Comp. Zool.)	
PLATYCRINUS TRUNCATULUS Hall . . . . .	675
11a. Side view of the calyx, showing the bases of the arms (enlarged).	
11b. Side view of another specimen.	



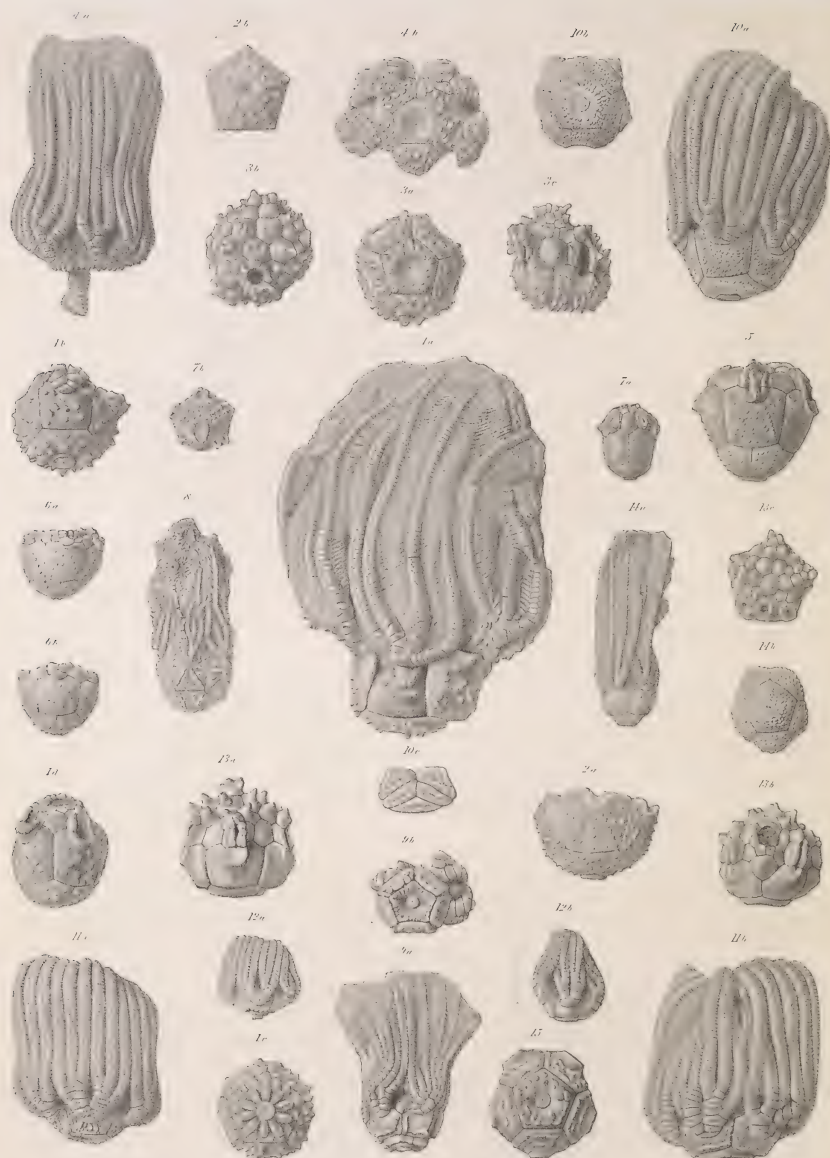
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# PLATE LXVIII.

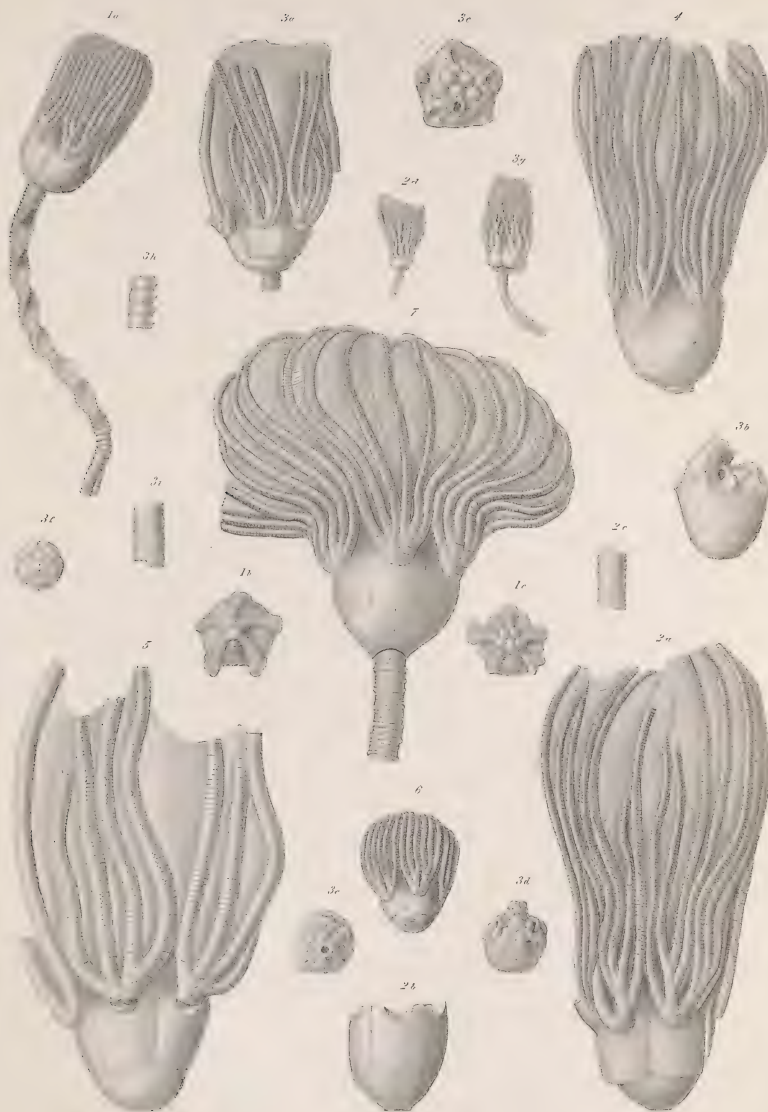
	PLATYCRINUS VERRUCOSUS White . . . . .	AGE 705
Fig. 1a.	The type specimen. (Mus. Comp. Zoöl.)	
1b.	Oblique view of the dorsal cup. (Coll. W. and Sp.)	
1c.	Another specimen; dorsal aspect of the calyx. (Same collection.)	
1d.	Lateral aspect of a variety from New Mexico, showing the anal opening. (Same collection.)	
	PLATYCRINUS POCILLIFORMIS Hall . . . . .	706
2a.	Lateral aspect of the dorsal cup (the ornamentation from another specimen). (Coll. W. and Sp.)	
2b.	Base of a specimen with larger nodes. (Coll. W. and Sp.)	
	PLATYCRINUS YANDELLI O. and Sh. . . . .	706
3a.	Dorsal aspect of the calyx; a very mature specimen. (Same collection.)	
3b.	Ventral aspect of the same specimen.	
3c.	Posterior view of same.	
	PLATYCRINUS YANDELLI, var. PERASPER . . . . .	708
4a.	Lateral view of a specimen with arms. (Mus. Comp. Zoöl.)	
4b.	Dorsal aspect of the same specimen (the stem removed).	
	PLATYCRINUS SCULPTUS Hall . . . . .	691
5.	Specimen from New Mexico, lateral view of the calyx. (Coll. W. and Sp.)	
	PLATYCRINUS PARVINODUS Hall . . . . .	696
6a.	Side view of the type, the specimen somewhat flattened. (Mus. Comp. Zoöl.)	
6b.	Anterior view of another specimen less distorted. (Coll. W. and Sp.)	
	PLATYCRINUS PECULIARIS W. and Sp. . . . .	700
7a.	Posterior view of the calyx; the nodes partly eroded by weathering. (Coll. W. and Sp.)	
7b.	Ventral aspect of the same specimen.	
	PLATYCRINUS GEOMETRICUS W. and Sp. . . . .	697
8.	Another type specimen. (Coll. W. and Sp.)	

	PLATYCRINUS ASPER M. and W. . . . .	PAGE 690
Fig. 9a.	The type specimen. (Mus. Comp. Zoöl.)	
9b.	Basal view of another specimen. (Mus. Comp. Zoöl.)	
	PLATYCRINUS ORNIGRANULUS McCh. . . . .	701
10a.	A fine specimen with arms, representing the typical form. (Mus. Comp. Zoöl.)	
10b.	Dorsal aspect of a very short calyx; showing the ornamentation. (Coll. W. and Sp.)	
10c.	A costal and two pairs of distichals.	
11a.	A specimen with coarser ornamentation. (Same collection.)	
11b.	A specimen with a somewhat different ornamentation. (Same collection.)	
12a.	A young specimen. (Coll. W. and Sp.)	
12b.	A still smaller specimen ( $\frac{3}{4}$ ). (Same collection.)	
	PLATYCRINUS EMINULUS Hall. . . . .	712
13a.	Anterior view of calyx. (Mus. Comp. Zoöl.)	
13b.	Posterior view of another specimen. (Same collection.)	
13c.	Ventral aspect of the calyx. (Coll. W. and Sp.)	
	PLATYCRINUS SCOBINA M. and W. . . . .	695
14a.	The type specimen. (Mus. Comp. Zoöl.)	
14b.	Dorsal aspect of the calyx. (Coll. W. and Sp.)	
	PLATYCRINUS GORBYI S. A. Miller . . . . .	716
15.	Dorsal aspect of the calyx. (Mus. Comp. Zoöl.)	



# PLATE LXIX.

	PAGE
PLATYCRINUS SYMMETRICUS W. and Sp. . . . .	655
Fig. 1 <i>a</i> . Specimen with arms and column.	
1 <i>b</i> . Ventral aspect of the calyx; a large specimen.	
1 <i>c</i> . Ventral aspect of a young specimen; the orals almost symmetrical.	
PLATYCRINUS PLANUS O. and Sh. . . . .	668
2 <i>a</i> . A large specimen with arms.	
2 <i>b</i> . Lateral view of the dorsal cup.	
2 <i>c</i> . A portion of the arms enlarged.	
2 <i>d</i> . A young specimen, apparently of this species.	
PLATYCRINUS BURLINGTONENSIS O. and Sh. . . . .	653
3 <i>a</i> . A medium sized specimen with arms. (After Meek and Worthen.)	
3 <i>b</i> . Lateral view of a large calyx.	
3 <i>c</i> . Ventral aspect of another large specimen, showing the anal tube.	
3 <i>d</i> . Posterior view of a smaller specimen.	
3 <i>e</i> . Ventral aspect of another small specimen.	
3 <i>f</i> . Dorsal cup of a young specimen. (Inadvertently drawn with left antero-lateral interradius at the top.)	
3 <i>g</i> . A very young specimen with zigzag arms, composed of single joints.	
3 <i>h</i> . Portion of an arm showing the lateral processes (enlarged).	
3 <i>i</i> . Portion of an arm in a dorsal aspect (enlarged).	
PLATYCRINUS AGASSIZI W. and Sp. . . . .	669
4. A very large specimen with arms.	
PLATYCRINUS PILEIFORMIS Hall . . . . .	656
5. A specimen with arms (slightly restored).	
PLATYCRINUS BONCENSIS White . . . . .	683
6. A specimen having six arms to the ray.	
PLATYCRINUS SARÆ Hall . . . . .	677
7. The type specimen. (After Hall.) Somewhat flattened.	
(All specimens in the collection of Wachsmuth and Springer, except that of 3 <i>a</i> , which is in the Museum of Comparative Zoölogy, and Fig. 7, which is in the Illinois State Museum.)	



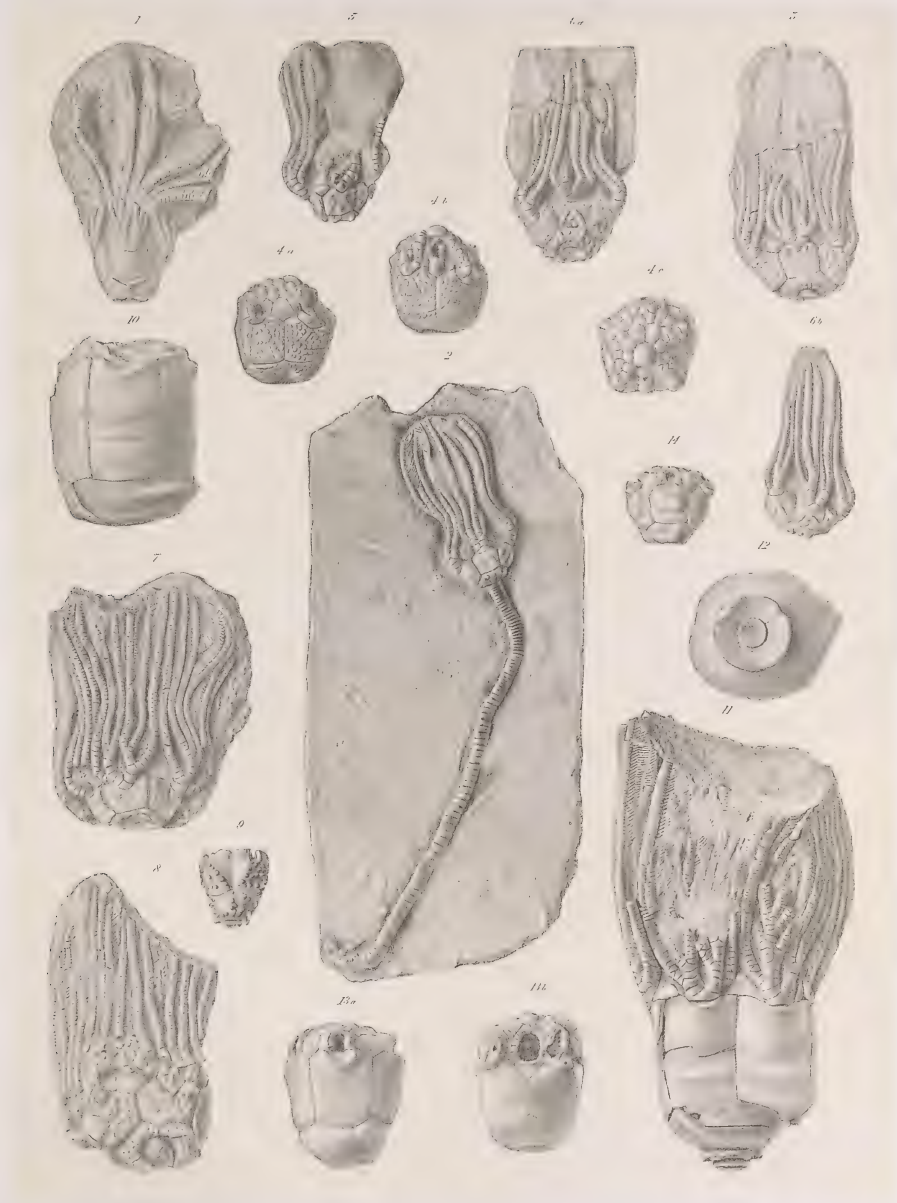






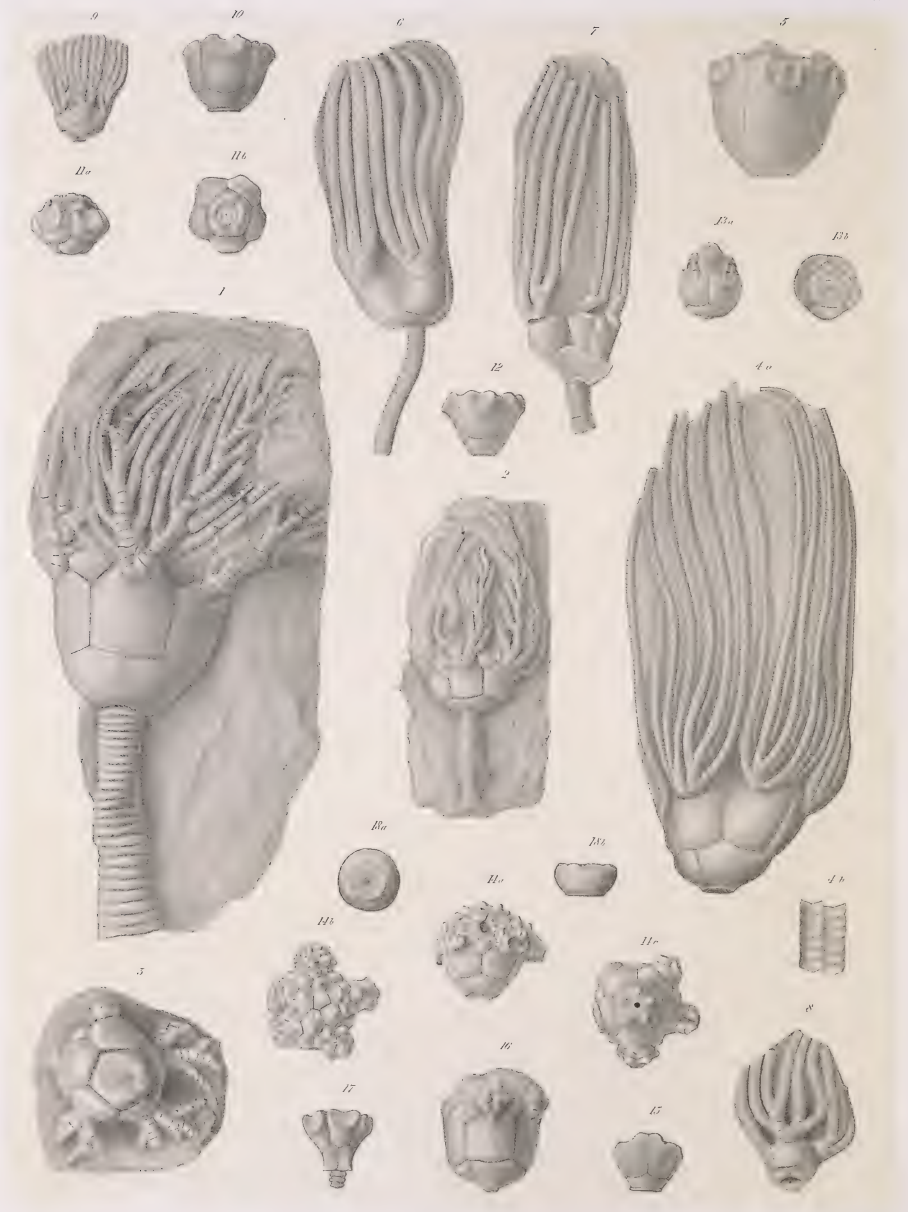
# PLATE LXX.

	PAGE
PLATYCRINUS SARÆ Hall . . . . .	677
Fig. 1. Specimen with faintly ornamented plates.	
PLATYCRINUS NODO-STRIATUS W. and Sp. . . . .	698
3. Specimen with six to the ray, the most frequent number.	
4a. Lateral view of the calyx; an older specimen.	
4b. Anal side of the same specimen.	
4c. Ventral aspect of same.	
PLATYCRINUS BREVINODUS Hall . . . . .	688
2. Specimen from the upper part of the Burlington limestone; with column, root, and four arms to the ray.	
5. Specimen from same horizon with six arms to the ray.	
6a and b. Two specimens from the Keokuk group of Indian Creek, Ind.	
PLATYCRINUS TENUIBRACHIATUS Meek and Worth. . . . .	687
7. A specimen with arms.	
8. Another specimen, slightly differing in ornamentation.	
PLATYCRINUS SUBSPINULOSUS Hall . . . . .	684
9. A highly ornamented calyx.	
PLATYCRINUS SAMPSONI S. A. Miller . . . . .	673
10. Lateral view of the calyx.	
PLATYCRINUS PRATTENI Worthen . . . . .	671
11. A specimen with arms.	
12. The basal disk.	
PLATYCRINUS PILEIFORMIS Hall . . . . .	656
13a. Lateral view of the calyx.	
13b. Posterior side of the calyx.	
PLATYCRINUS DAVISI W. and Sp. . . . .	684
14. Lateral view of the type specimen.	
(All the specimens in the collection of Wachsmuth and Springer.)	











# PLATE LXXI.

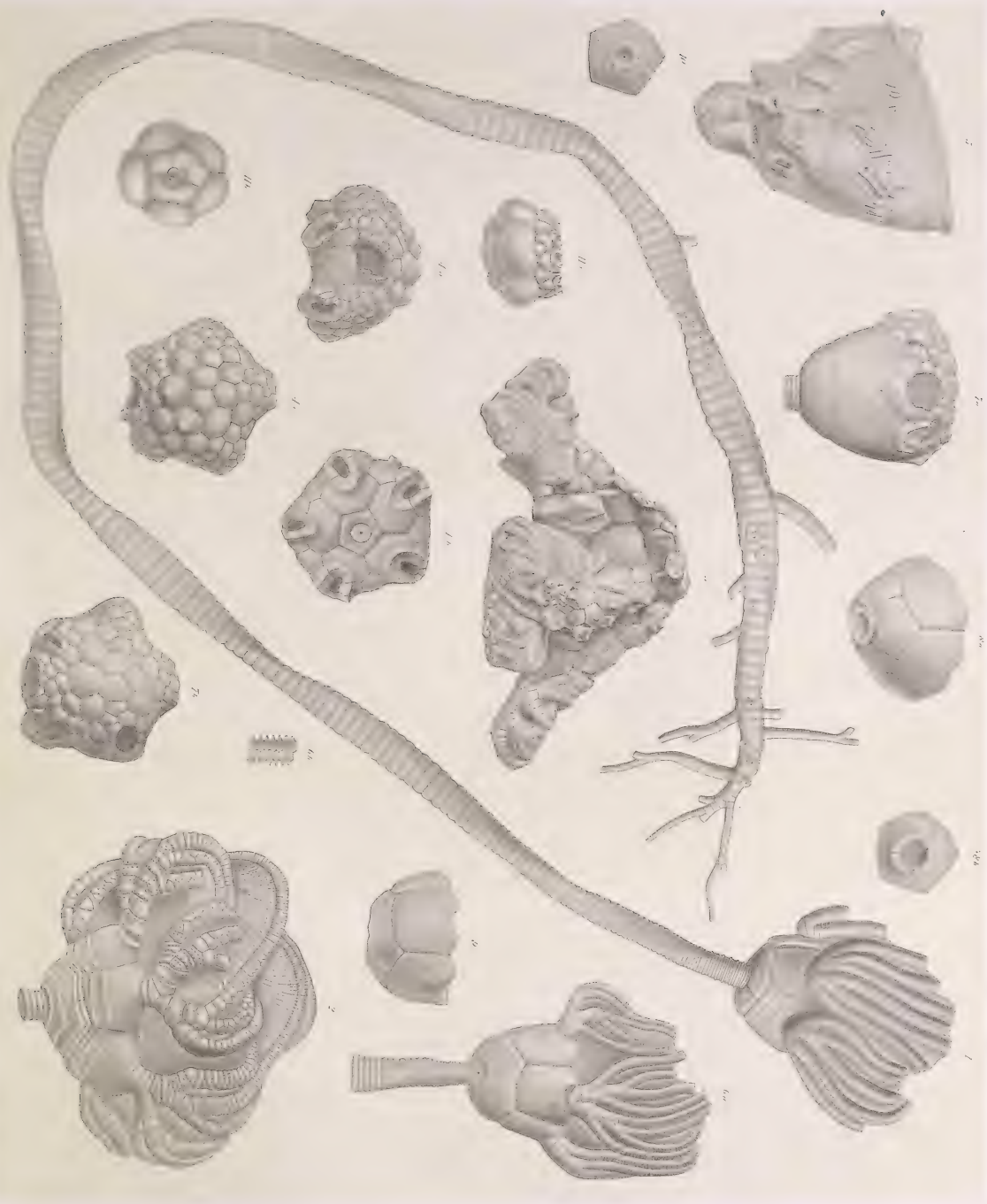
	PAGE
PLATYCRINUS INCOMPTUS White . . . . .	664
Fig. 1. A very large specimen, showing the numerous ramifications of the arms. (Coll. W. and Sp.)	
2. A small specimen, showing the same. (Same collection.)	
3. The type specimen. (Mus. Comp. Zool.)	
PLATYCRINUS ÆQUALIS Hall . . . . .	674
4a. A very large specimen with arms. (Same collection.)	
4b. Portion of an arm (enlarged).	
5. The calyx, showing the radial facets and the small first costal. (Coll. W. and Sp.)	
PLATYCRINUS LODENSIS Hall and Whitf. . . . .	666
6. The type specimen. (After Hall and Whitfield.)	
PLATYCRINUS GRAPHICUS Hall and Whitf. . . . .	672
7. The type specimen. (After Hall and Whitfield.)	
PLATYCRINUS CONTRITUS Hall and Whitf. . . . .	667
8. The type specimen. (After Hall and Whitfield.)	
PLATYCRINUS NIOTENSIS Meek and Worthen . . . . .	682
9. Specimen with arms (from Indiana).	
PLATYCRINUS BRITTSI S. A. Miller . . . . .	659
10. The type specimen. (Coll. F. A. Sampson, Sedalia).	
PLATYCRINUS CORBULIFORMIS Rowley and Hare . . . . .	657
11a. Dorsal cup in a side view.	
11b. Dorsal aspect of the same specimen. (Coll. R. R. Rowley.)	
PLATYCRINUS ÆQUITERNUS S. A. Miller . . . . .	658
12. The type specimen. (Coll. F. A. Sampson.)	
PLATYCRINUS PISUM Rowley and Hare . . . . .	660
13a. The type specimen; posterior view. (Coll. R. R. Rowley.)	
13b. Dorsal aspect of same.	

PLATYCRINUS QUINQUENODUS White . . . . .	Page 661
Fig. 14 <i>a</i> . The type specimen; lateral view of calyx. (Mus. Comp. Zool.)	
14 <i>b</i> . Ventral aspect of same.	
14 <i>c</i> . Dorsal aspect of same.	
PLATYCRINUS INSOLENS Rowley and Hare . . . . .	659
15. The type specimen. (Coll. R. R. Rowley.)	
PLATYCRINUS PECULIARIS W and Sp. . . . .	700
16. The type, a rather large example. (Coll. W. and Sp.)	
PLATYCRINUS ALLOPHYLUS S. A. Miller . . . . .	685
17. The type specimen. (Coll. F. A. Sampson.)	
PLATYCRINUS TRUNCATULUS Hall . . . . .	675
18 <i>a</i> . Dorsal aspect of the calyx. (Coll. W. and Sp.)	
18 <i>b</i> . Side view of the dorsal cup.	



# PLATE LXXII.

	PAGE
PLATYCRINUS REGALIS Hall . . . . .	710
Fig. 1. Specimen with arms, stem, and root. The calyx of this specimen is much distorted by pressure, and the surface ornamentation obscure, so that in some of the characters it gives an incorrect impression, and does not represent a typical example of the species. (Coll. W. and Sp.)	
2. The type specimen. (Mus. Comp. Zool.)	
EUCLADOCRINUS TUBEROSUS (Hall) . . . . .	728
3. Specimen, showing the small branching arms given off from the tubular appendages. (Coll. W. and Sp.)	
4a. Posterior side of the calyx. (Same collection.)	
4b. Dorsal aspect of the same specimen.	
4c. Ventral aspect of same.	
EUCLADOCRINUS MONTANENSIS Meek . . . . .	723
5. The type specimen. (National Museum at Washington.)	
PLATYCRINUS HALLI Shumard . . . . .	662
6a. Specimen with arms and stem. (Coll. W. and Sp.)	
6b. Portion of an arm, enlarged.	
7a. Posterior side of the calyx. (Same collection.)	
7b. Ventral aspect of the same specimen.	
PLATYCRINUS BOONVILLENIS S. A. Miller . . . . .	681
8a. The type specimen, showing the dorsal cup. (After Miller.)	
8b. Dorsal aspect of the base. (Coll. W. and Sp.)	
9. Another specimen. (Coll. F. A. Sampson.)	
PLATYCRINUS ORNIGRANULUS McCh. . . . .	701
10. Basal disk, showing the ornamentation.	
MARSUPIOCRINUS PRÆMATURES (Hall and Whitf.). . . . .	734
11a. Side view of the type specimen.	
11b. Dorsal aspect of the same. (After Hall and Whitfield.)	





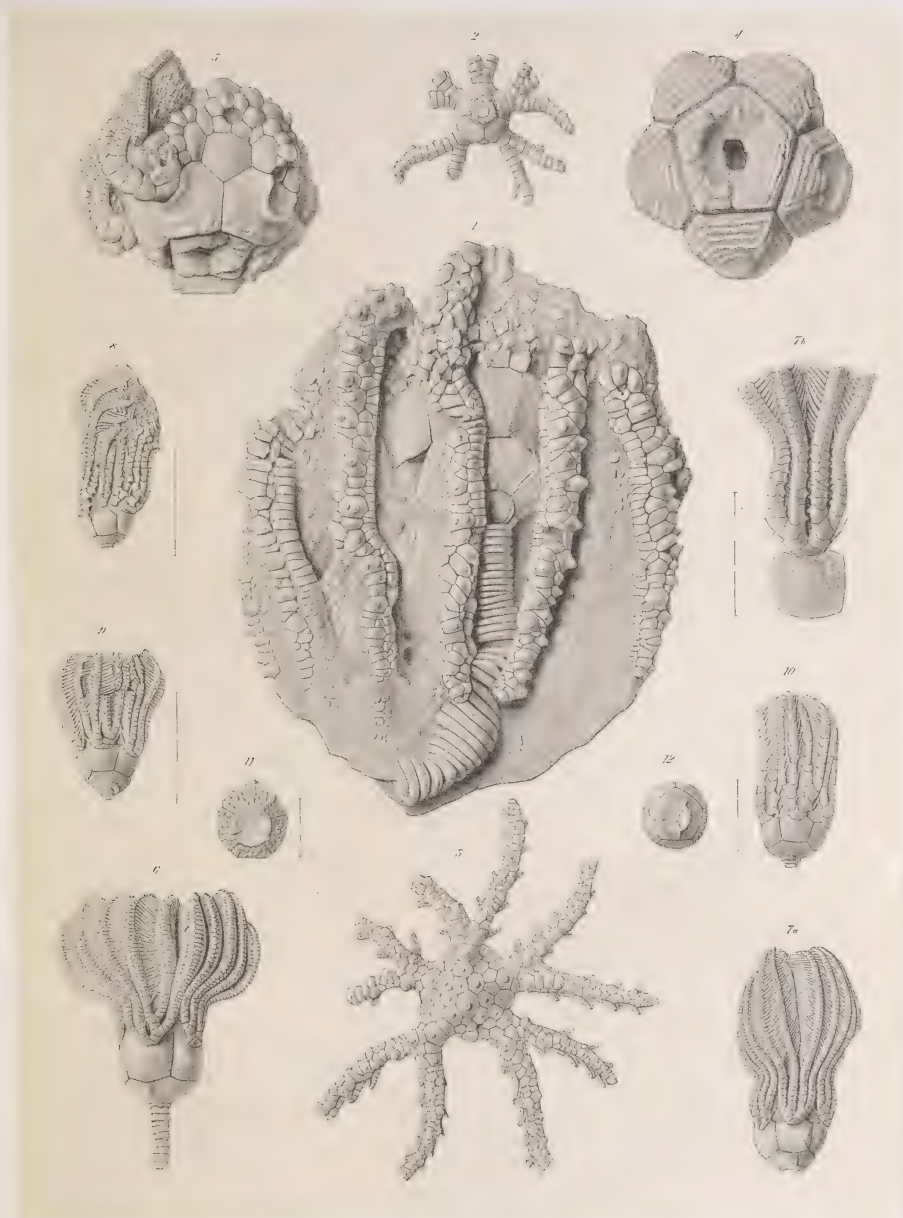




# PLATE LXXIII.

	PAGE
EUCLADOCRINUS MILLEBRACHIATUS W. and Sp. . . . .	720
Fig. 1. A large specimen; the tubular appendages hanging over the calyx.	
EUCLADOCRINUS MILLEBRACHIATUS, var. IMMATURUS W. and Sp. . . . .	722
2. Dorsal view of a small specimen; the tubular appendages directed horizontally.	
3. Ventral aspect of a larger specimen, showing the bases of the arms.	
EUCLADOCRINUS PLEUROVIMINEUS (White) . . . . .	724
4. A large specimen, showing the dorsal side of the calyx.	
EUCLADOCRINUS PRÆNUNTIUS W. and Sp. . . . .	726
5. One of the type specimens, showing calyx and portions of the arms.	
PLATYCRINUS HUNTSVILLE (Troost) W. and Sp. . . . .	678
6. A large specimen with inflated arms; the plates of the calyx not ornamented.	
7a. Another mature specimen with ornamented calyx plates, the arms gradually tapering.	
7b. A portion of one ray enlarged, showing the spinous processes at the sides of the arm plates, the waving suture lines between the lower brachials, and the arrangement of the pinnules ( $\frac{2}{3}$ ).	
8b. An immature specimen; the arms uniserial to nearly one half of their length ( $\frac{1}{2}$ ).	
9. A more mature specimen ( $\frac{1}{3}$ ).	
10. A very young specimen, the arms composed of comparatively elongate plates, and uniserial almost to their tips ( $\frac{1}{3}$ ).	
11. The base of a highly ornamented specimen.	
12. The base of a smooth specimen.	

(All the specimens in the collection of Wachsmuth and Springer.)



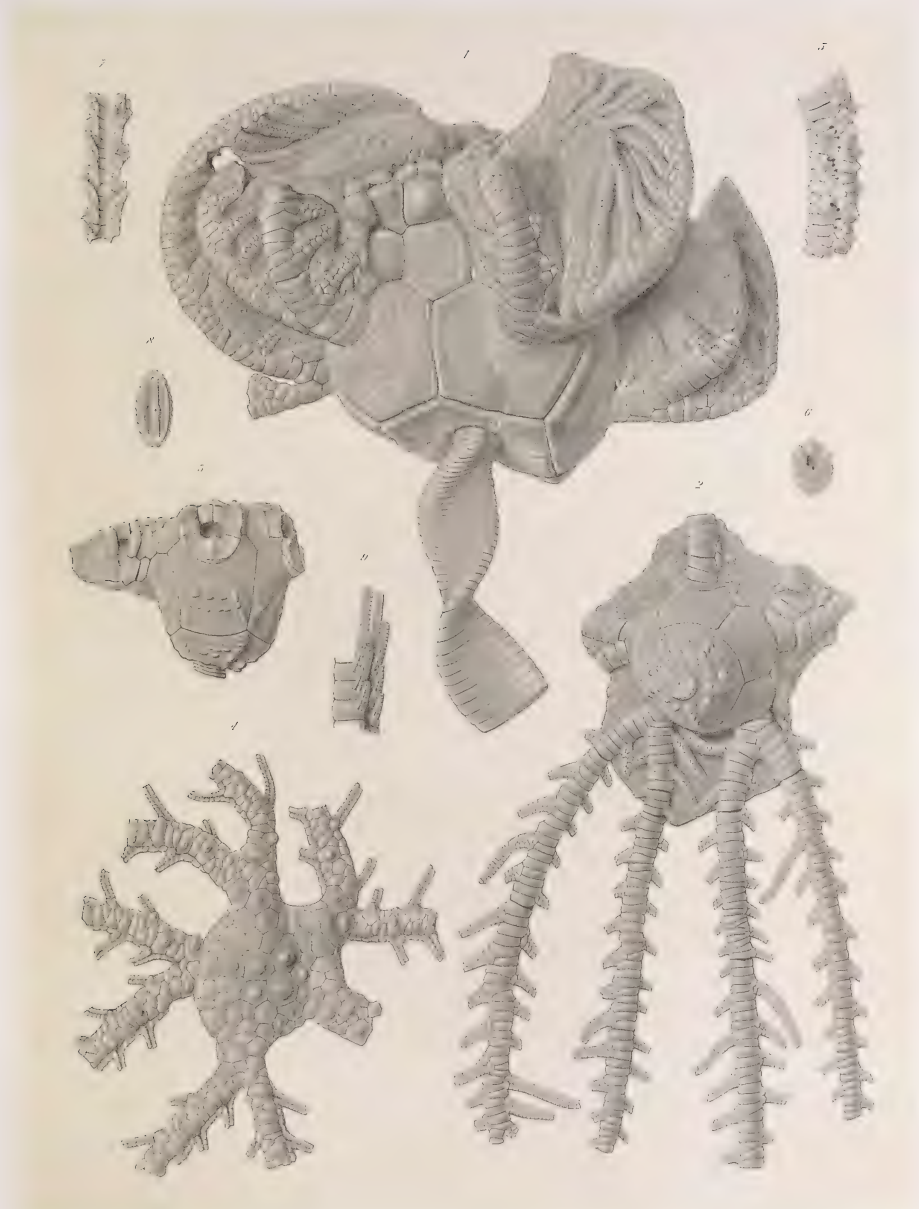




# PLATE LXXIV.

	EUCLADOCRINUS PLEUROVIMINEUS (White) . . . . .	PAGE 724
Fig. 1.	A magnificent specimen, showing the calyx, the tubular appendages, arms, and column.	
	EUCLADOCRINUS MILLEBRACHIATUS W. and Sp. . . . .	720
2.	A moderately large specimen, showing the dorsal side of the calyx, tubular appendages, and arms.	
3.	Side view of the calyx.	
4.	Ventral aspect of a fine specimen, showing the rigid covering pieces of the tubular appendages, and the ventral furrows along the arms.	
5.	Lateral view of one of the tubular appendages, showing the arm openings, and the respiratory pores at the base of the arms.	
6.	Cross section of an appendage, showing the central cavity.	
7.	The appendage with the covering pieces removed.	
8.	Distal face of a stem joint from near the calyx, showing the transverse ridge, and the minute axial canal.	
9.	Portion of an arm enlarged, showing the pinnules.	

(All the specimens in the collection of Wachsmuth and Springer.)









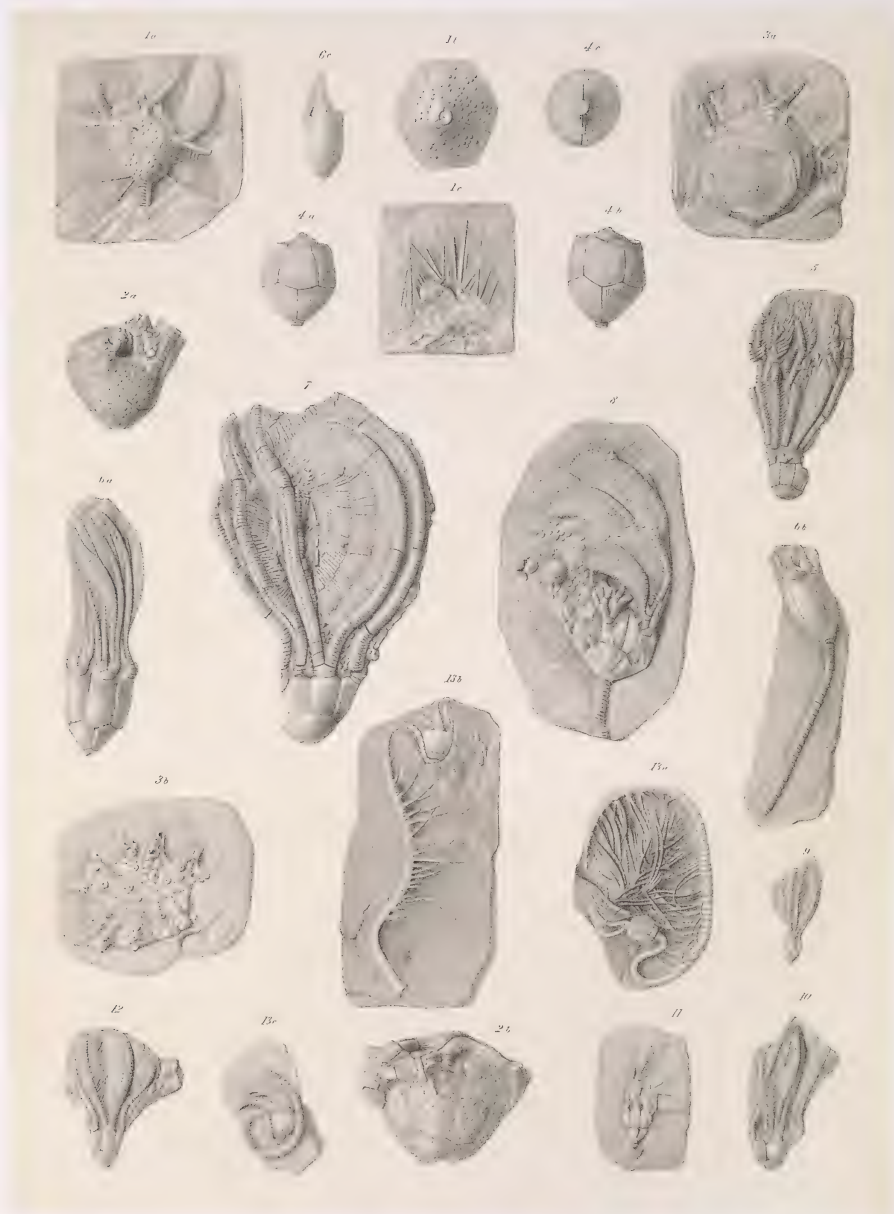


# PLATE LXXV.

	PAGE
CAMPTOCRINUS MYELODACTYLUS W. and Sp. . . . .	779
Fig. 1. A specimen with stem and cirri. (Coll. W. and Sp.)	
2a and b. Portions of the coiled stem in different specimens, showing the cirri.	
DICHOCHRINUS BLAIRI S. A. Miller . . . . .	778
3. The type specimen. (After Miller.)	
DICHOCHRINUS HUNTSVILLE W. and Sp. . . . .	778
4. The type specimen. (Coll. W. and Sp.)	
DICHOCHRINUS CINCTUS S. A. MILLER . . . . .	764
5. Specimen with arms. (Same collection.)	
DICHOCHRINUS CONUS Meek and Worthen . . . . .	770
6. The type specimen. (Illinois State collection.)	
PLATYCRINUS CANALICULATUS Hall . . . . .	680
7a. Specimen with arms. (Coll. W. and Sp.)	
7b. Dorsal aspect of the calyx. (Same collection.)	
PLATYCRINUS SCULPTUS Hall . . . . .	691
8. A large specimen with arms. (Same collection.)	
9. A smaller specimen. (Mus. Comp. Zool.)	
PLATYCRINUS AMERICANUS O. and Sh. . . . .	686
10. A mature specimen with arms; the latter biserial from above the last bifurcation. (Coll. W. and Sp.)	
11. A young specimen; the arms uniserial and zigzag, the joints elongate, and the pinnules far apart. (Same collection.)	
12. Dorsal aspect of the calyx. (Same collection.)	
13a. Side view of the calyx of a large specimen. (Same collection.)	
13b. Anal side of the same specimen.	
13c. Ventral aspect of the same.	
14. Natural cast, probably of CULICOCRINUS . . . . .	735
From the Niagara group of Iowa. (Same collection.)	

	PAGE
CoccoCRINUS BACCA F. Römer . . . . .	739
Fig. 15a. Dorsal aspect of the calyx (drawn with the anal interradius at the lower left side).	
15b. Right anterior side of the same specimen.	
15c. Posterior side of same. (Same collection.)	
MARSUPIOCRINUS TENNESSEENSIS (F. Römer) . . . . .	731
16a. Dorsal view of the calyx. (Coll. W. and Sp.)	
16b. Ventral aspect of the same specimen.	
MARSUPIOCRINUS STRIATUS W. and Sp. . . . .	732
17. Dorsal view of a rather small specimen. (Same collection.)	
18. Ventral aspect of another specimen.	
MARSUPIOCRINUS TENTACULATUS (Hall) . . . . .	733
19a. The type specimen. (After Hall.)	
19b. Enlargement of one of its rays. (After Hall.)	
CORDYLOCRINUS PLUMOSUS (Hall) . . . . .	737
20. The type specimen. (After Hall.)	





# PLATE LXXVI.

	PAGE
ARTHACANTHA ITHACENSIS Williams . . . . .	749
Fig. 1a. Lateral view of a specimen with arms. (Museum Cornell University.)	
1b. Basal disk.	
1c. The movable spines upon the tegmen.	
ARTHACANTHA PUNCTOBRACHIATA Williams . . . . .	750
2a. Specimen showing spine bases. (Coll. W. and Sp.)	
2b. Another specimen with some spines attached. (Coll. Prof. S. Calvin.)	
ARTHACANTHA DEPRESSA W. and Sp. . . . .	751
3a. Dorsal aspect of the type specimen. (Coll. W. and Sp.)	
3b. Ventral aspect of the same specimen.	
DICHOGRINUS LINEATUS Meek and Worthen . . . . .	761
4a. The type specimen; posterior view of the calyx. (Mus. Comp. Zool.)	
4b. Anterior view of the same specimen.	
4c. Dorsal aspect of same.	
DICHOGRINUS PISUM Meek and Worthen . . . . .	763
5. Specimen with arms. (Mus. Comp. Zool.)	
DICHOGRINUS CRASSITESTUS White . . . . .	769
6a. The type specimen; the anterior side exposed. (Same collection.)	
6b. Another specimen with part of the column attached. (Coll. W. and Sp.)	
6c. Posterior view of the calyx and anal tube. (Same collection.)	
DICHOGRINUS OVATUS Owen and Shumard . . . . .	760
7. A fine specimen with arms. (Mus. Comp. Zool.)	
DICHOGRINUS LIRATUS Hall . . . . .	759
8. Specimen with arms and part of column. (Same collection.)	
DICHOGRINUS COXANUS Worthen . . . . .	763
9. The type specimen. (Coll. L. A. Cox.)	
DICHOGRINUS HAMILTONENSIS Worthen . . . . .	772
10. The type specimen. (Same collection.)	



	DICHOCRINUS ANGUSTUS White . . . . .	PAGE 768
Fig. 11.	Posterior view of a specimen with arms. (Coll. W. and Sp.)	
	DICHOCRINUS SUPERSTES W. and Sp. . . . .	766
12.	Side view of the type specimen. (Same collection.)	
	CAMPTOCRINUS CIRRIFER W. and Sp. . . . .	780
13a.	The type specimen, showing the curved cirrus-bearing stem; from the Kaskaskia group of Kentucky. (Coll. W. and Sp.)	
13b.	Another specimen from the Kaskaskia group. (Same collection.)	
13c.	A specimen from the St. Louis group of Huntsville, Ala. (Same collection.)	



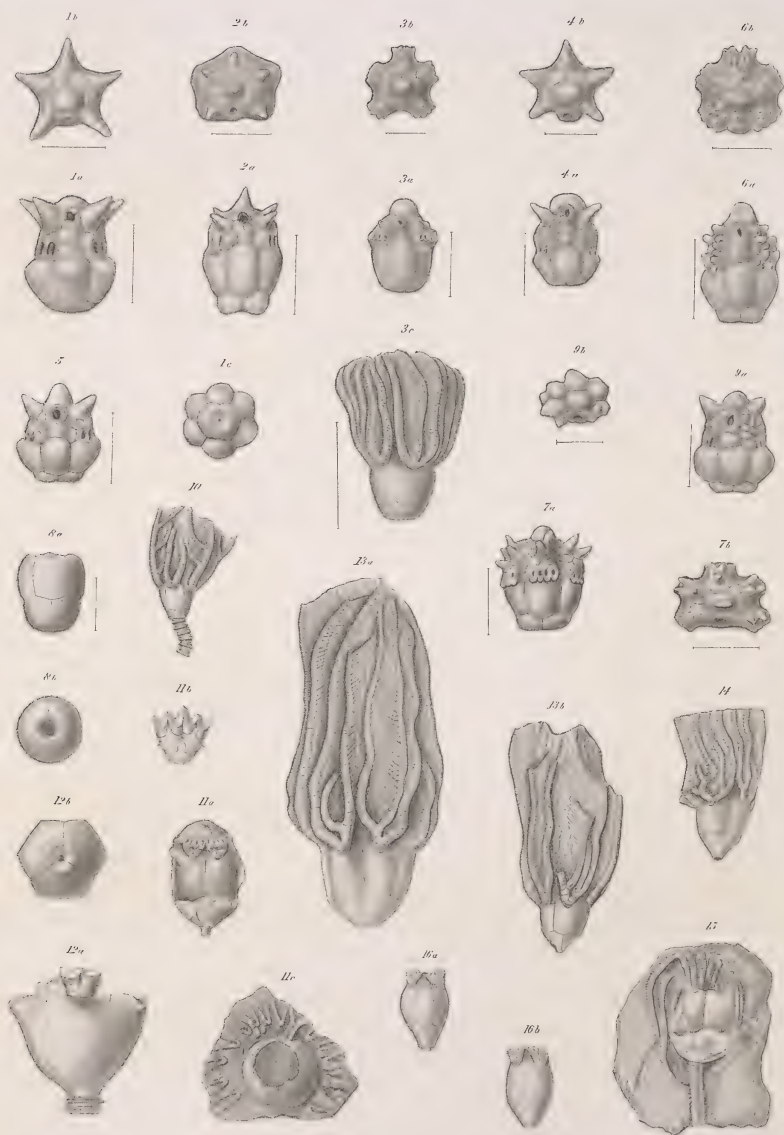


# PLATE LXXVII.

	PAGE
DICHOCRINUS POLYDACTYLUS Cass. and Lyon . . . . .	756
1 <i>a</i> . A large specimen with arms.	
1 <i>b</i> . Posterior view of calyx, showing the elevated dome and disk ambulacra.	
DICHOCRINUS LACHRYMOSUS Hall . . . . .	754
2 <i>a</i> . Specimen with arms and stem.	
2 <i>b</i> . Posterior view of calyx.	
2 <i>c</i> . Ventral aspect of same.	
DICHOCRINUS LIRATUS Hall . . . . .	759
3 <i>a</i> . Specimen showing the arms and stem.	
3 <i>b</i> . Posterior view of the dorsal cup.	
DICHOCRINUS CINCTUS Miller and Gurley . . . . .	764
4 <i>a</i> . Posterior view of specimen with arms.	
4 <i>b</i> . Ventral aspect of the calyx.	
4 <i>c</i> . Distal face of first distichal (†).	
DICHOCRINUS PLICATUS Hall . . . . .	758
5 <i>a</i> . A small specimen with arms and stem.	
5 <i>b</i> . Another specimen, giving a side view of the dorsal cup.	
DICHOCRINUS ORNATUS W. and Sp. . . . .	762
6. Specimen with arms and stem, from near Mt. Pleasant, Iowa.	
DICHOCRINUS LÆVIS Hall . . . . .	765
7 <i>a</i> . Specimen with arms. (Coll. Mr. Fultz of Burlington.)	
7 <i>b</i> . Another specimen. (Same collection.)	
7 <i>c</i> . Portion of an arm with pinnules (enlarged).	
DICHOCRINUS OVATUS O. and Sh. . . . .	760
8 <i>a</i> . A specimen with arms.	
8 <i>b</i> . Posterior view of the dorsal cup.	
DICHOCRINUS OBLONGUS W. and Sp. . . . .	759
9. Posterior view of the type specimen.	

	DICHOCRINUS PISUM M. and W. . . . .	PAGE 763
Fig. 10. Posterior side of the dorsal cup. (After Meek and Worthen.)		
	DICHOCRINUS STRIATUS O. and Sh. . . . .	757
11a. Posterior side of the dorsal cup.		
11b. Side view of another specimen.		
	DICHOCRINUS INORNATUS W. and Sp. . . . .	770
12a. Posterior view of a specimen with arms.		
12b. Another specimen.		
	DICHOCRINUS DELICATUS W. and Sp. . . . .	766
13. The type specimen.		
(All the specimens, except 7a, b and 10, are in the collection of Wachsmuth and Springer.)		







# PLATE LXXVIII.

	PAGE
TALAROCRINUS SEXLOBATUS (Shumard) . . . . .	784
Fig. 1a. Posterior view of a specimen from Flagpoint, Va. ( $\frac{1}{2}$ ). (Coll. W. and Sp.)	
1b. Ventral aspect of the same specimen ( $\frac{1}{2}$ ).	
1c. Dorsal view of the calyx. (Coll. W. and Sp.)	
TALAROCRINUS OVATUS Worthen. . . . .	787
2a. Posterior view of the type specimen ( $\frac{1}{2}$ ). (Illinois St. Coll.)	
2b. Ventral aspect of the same specimen ( $\frac{1}{2}$ ).	
TALAROCRINUS DECORNIS W. and Sp. . . . .	788
3a. Posterior view of the type specimen ( $\frac{1}{2}$ ). (Coll. W. and Sp.)	
3b. Ventral aspect of the same ( $\frac{1}{2}$ ).	
3c. Specimen with arms ( $\frac{1}{2}$ ). (Same collection.)	
TALAROCRINUS SYMMETRICUS (Cass. and Lyon). . . . .	786
4a. Posterior view of the calyx ( $\frac{1}{2}$ ). (Coll. W. and Sp.)	
4b. Ventral aspect of the same specimen ( $\frac{1}{2}$ ).	
5. Posterior view of type ( $\frac{1}{2}$ ). (Coll. S. S. Lyon.)	
TALAROCRINUS CORNIGERUS (Shumard) . . . . .	783
6a. Posterior view of a specimen from Pulaski Co., Ky. (Coll. W. and Sp.)	
6b. Ventral aspect of the same specimen ( $\frac{1}{2}$ ).	
7a. Anterior view of the type specimen, from Alabama ( $\frac{1}{2}$ ). (Mus. Washington University, St. Louis.)	
7b. Ventral aspect of the same ( $\frac{1}{2}$ ).	
TALAROCRINUS SIMPLEX (Shumard) . . . . .	790
8a. Anterior view of the dorsal cup ( $\frac{1}{2}$ ). (Coll. W. and Sp.)	
8b. Dorsal aspect of a larger specimen. (Same collection.)	
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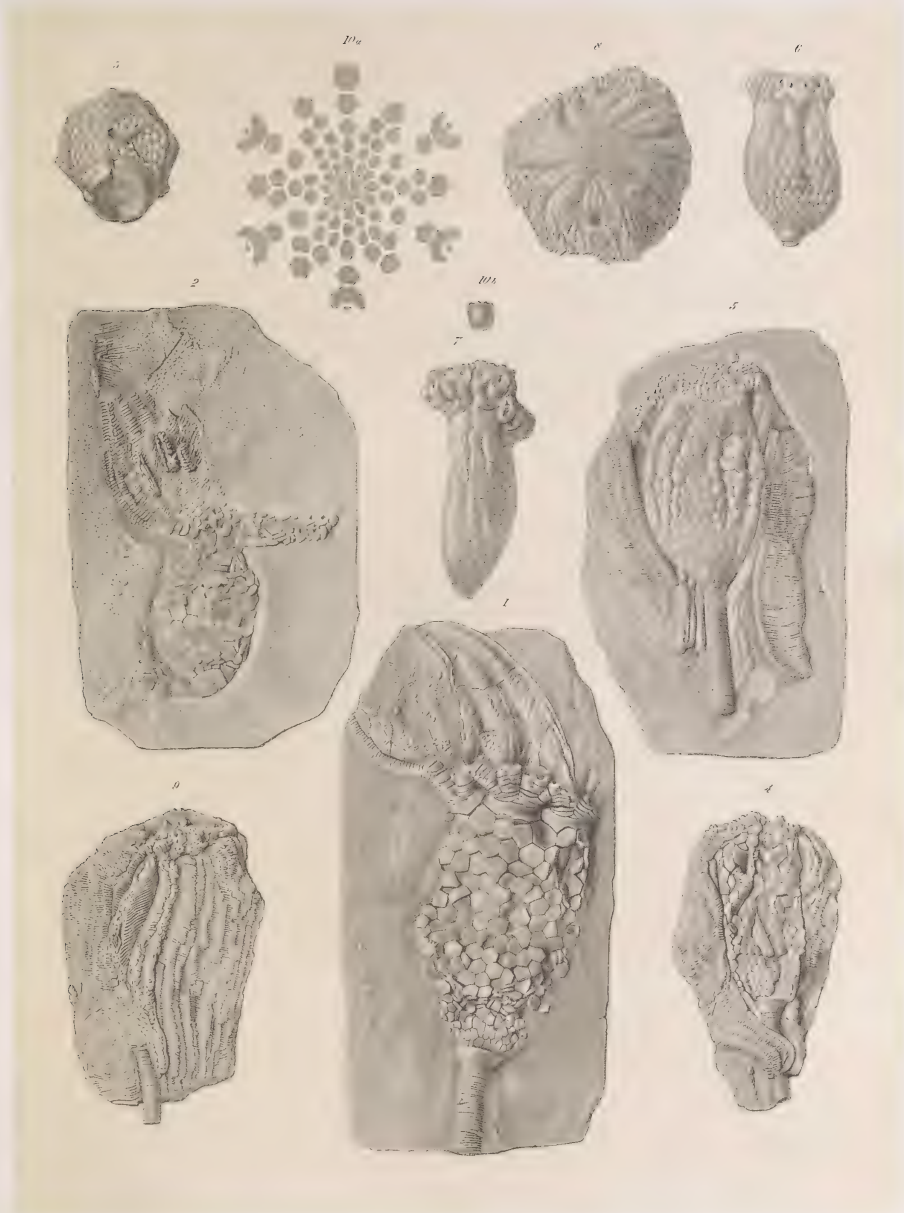
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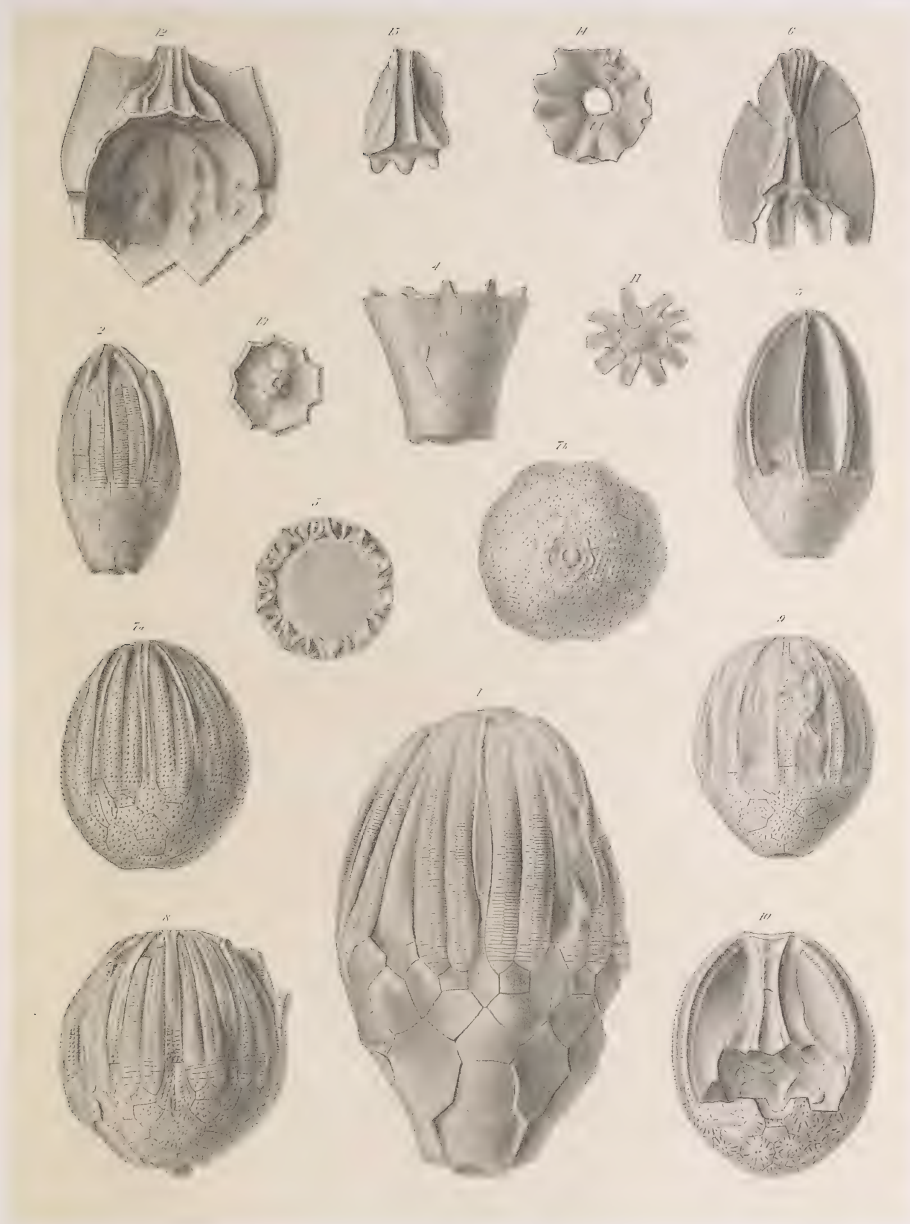






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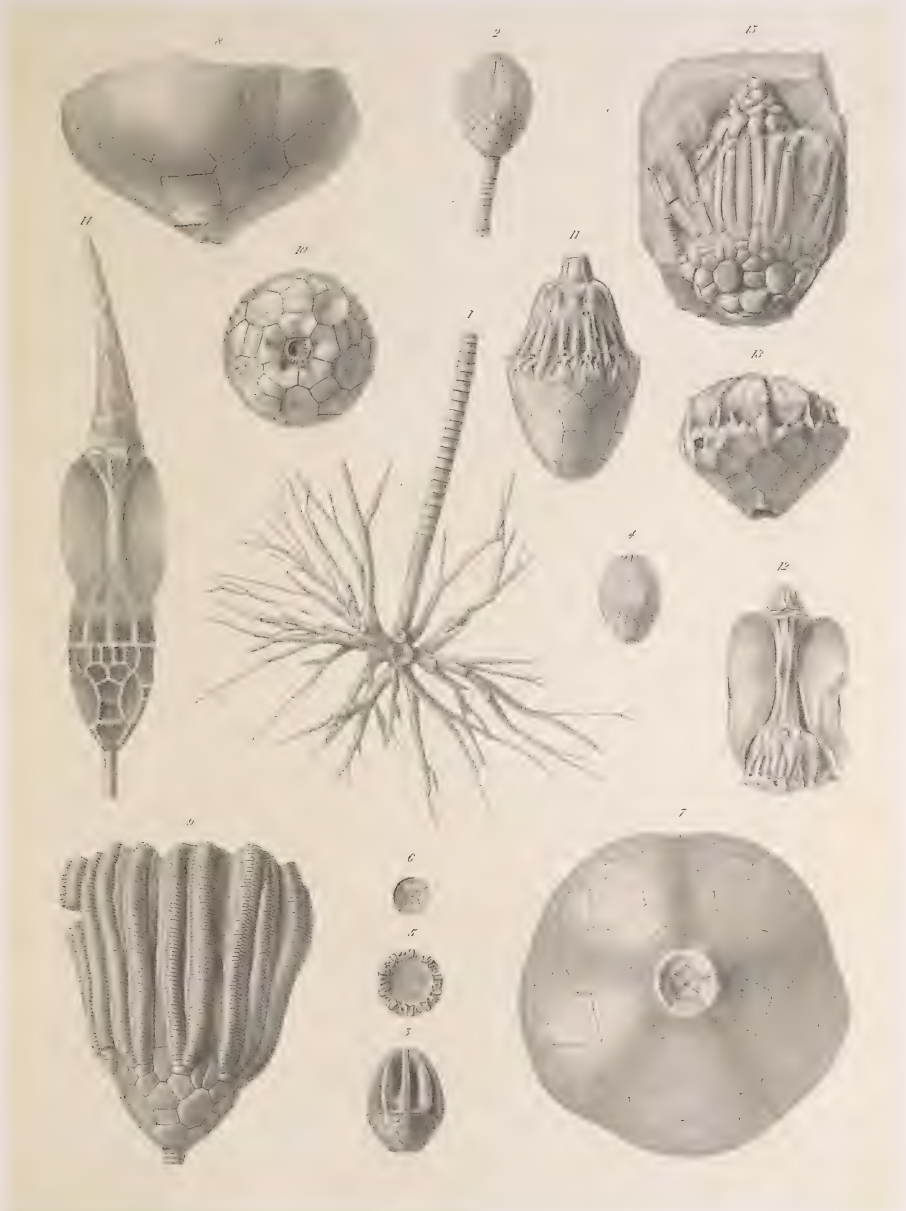






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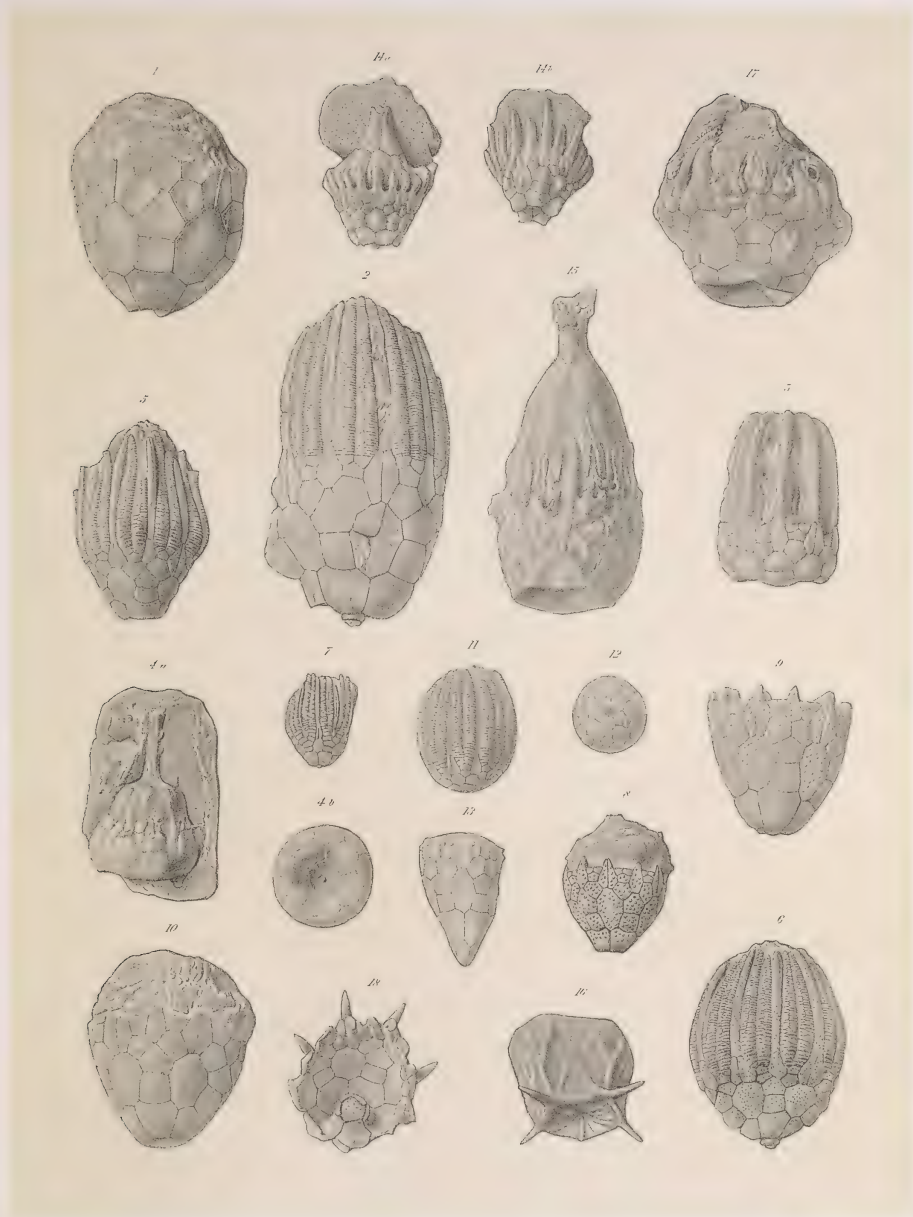






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